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UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 794

Contribution from the Bureau of Biological Survey
E. W. NELSON, Chief

Washington, D. C. PROFESSIONAL PAPER March 23, 1920

WATERFOWL AND THEIR FOOD PLANTS IN THE SANDHILL REGION OF NEBRASKA,

Part I. WATERFOWL IN NEBRASKA

By HARRY C. OBERHOLSER, Assistant Biologist

Part II. WILD-DUCK FOODS OF THE SANDHILL REGION OF NEBRASKA

By W. L. McATEE, Assistant Biologist

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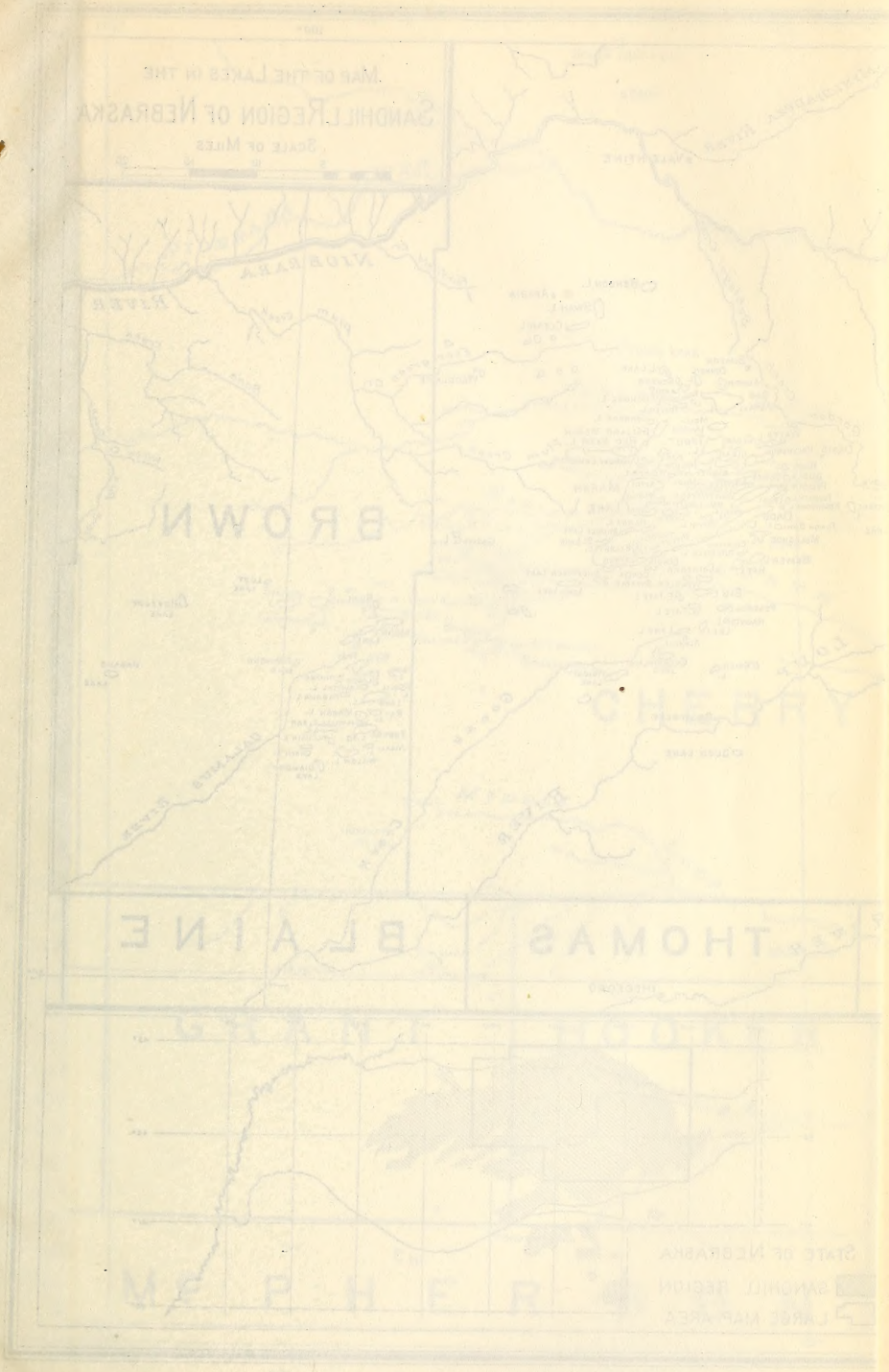

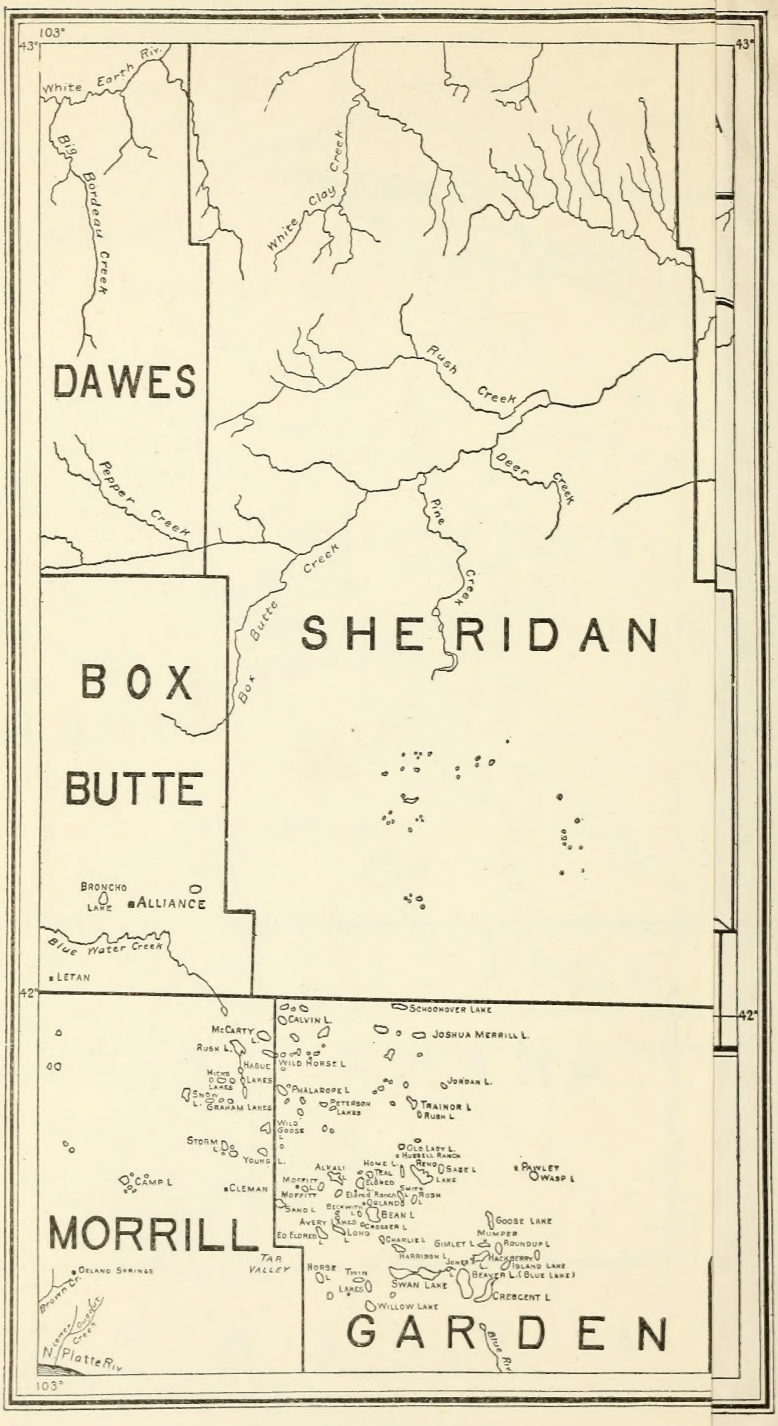
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White Earth Riv.
Big Bordeau Creek
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ALLIANCE
Blue Water Creek
LETAN
42°
SCHOONOVER LAKE
CALVIN L.
JOSHUA MERRILL L.
McCARTY
RUSH L.
WILD HORSE L.
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HICKS LAKES
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PETERSON LAKES
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RUBY L.
WILD GOOSE L.
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GOOSE LAKE
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CHARLIE L.
GIMLET L.
ROUNDUP L.
HARRISON L.
JAMES L.
HACKBERRY ISLAND LAKE
BEAVER L.
BLUE LAKE
MORRILL
TAR VALLEY
HORSE L.
TWIN LAKES
SWAN LAKE
CRESCENT L.
WILLOW LAKE
GARDEN
GELANO SPRINGS
Browns Creek
Lawrence Douglas Creek
N. Platte Riv.
Niobrara Riv.
103°

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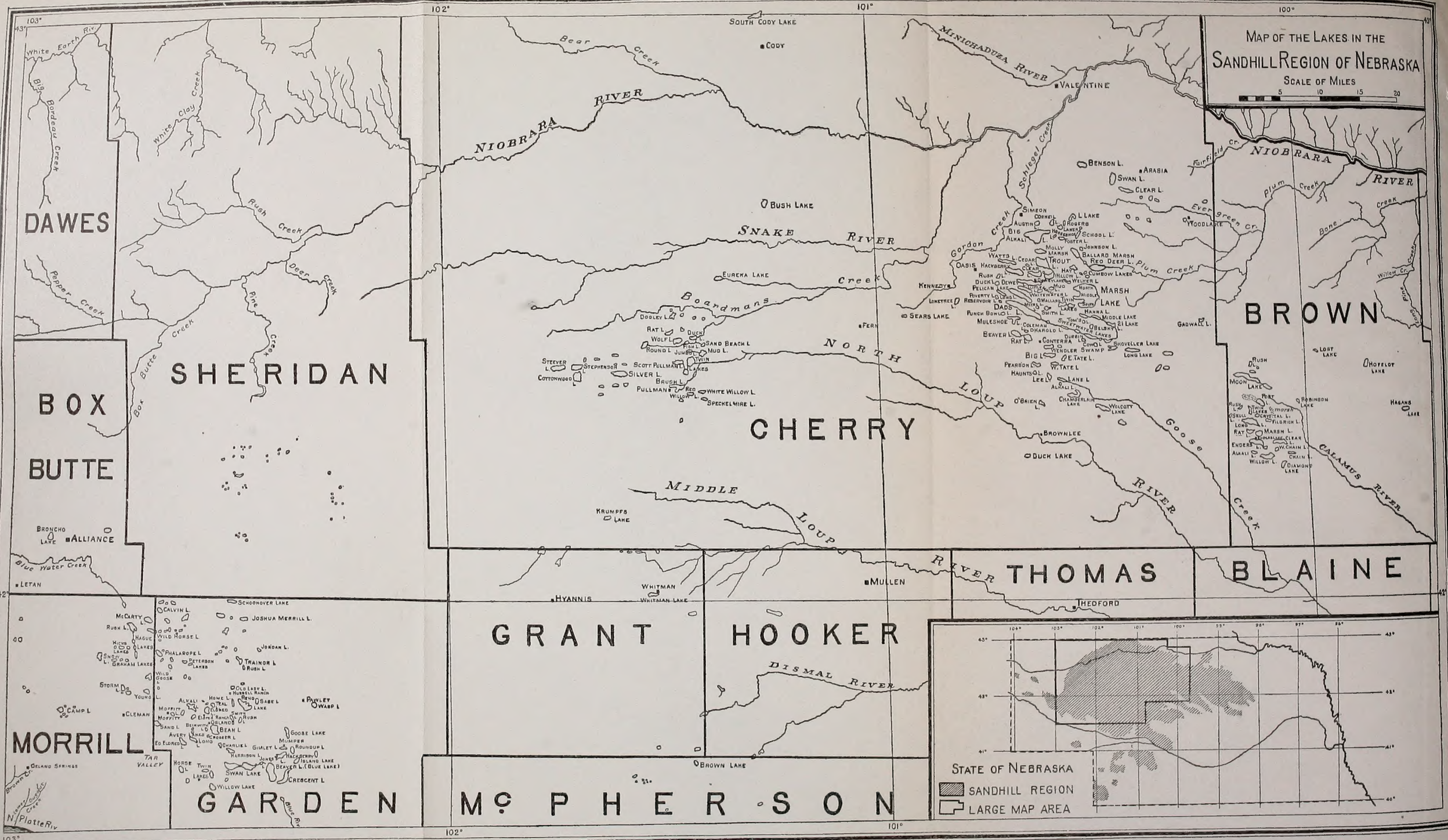
GENERAL INTRODUCTION.

Throughout the United States the draining of marshes and shallow lakes has proved during recent years a menace to the preservation of waterfowl. Many of these lakes were formerly the homes of countless wild fowl during both the breeding season and the migrations, but so general has the draining of lakes and marshes become that the remaining available resorts for these birds are becoming more and more limited. It is of the greatest importance, therefore, that accurate knowledge regarding the condition of the present breeding and wintering grounds be secured, in order that steps may be taken before it is too late to conserve the remaining supply of waterfowl inhabiting these areas. In view of the constant diminution in the numbers of our waterfowl and the consequent menace to the continuance of duck hunting as a sport, as well as to the very existence of the birds themselves, the protection of waterfowl on their breeding grounds becomes a matter of prime necessity.

The Biological Survey has long recognized this need, and is making efforts to ascertain the exact conditions prevailing on the



MAP OF THE LAKES IN THE SANDHILL REGION OF NEBRASKA.

breeding grounds of waterfowl in various parts of the United States. This is by no means an unimportant part of the inventory of our natural resources which is so necessary if we are to take intelligently directed steps toward passing on what remains of our heritage of natural wealth.

Efforts to increase the numbers of native waterfowl may be grouped in two main divisions: (1) Protection by legislation, which will save what breeding stock we have and give it a chance to multiply; and (2) bettering conditions on the breeding grounds, including elimination of natural enemies and improvement in the supply of the vegetation furnishing cover and food. The Biological Survey is interested in all these efforts and stands ready to give information and assistance to individuals or organizations desiring to carry on such work.

The present report is the first of a series designed to present information on the breeding, wintering, and hunting grounds of waterfowl in the United States. It consists of a report by Dr. Harry C. Oberholser on the water birds, together with data on the numbers and species occurring during the breeding and hunting seasons in Nebraska, chiefly in the sandhill region, which information is a necessary basis for protective legislation; and a report by Mr. W. L. McAtee on the vegetation of 44 lakes of the sandhill region, together with notes on the value of the plants as wild-duck food, and suggestions for improvements.

Part I.—WATERFOWL IN NEBRASKA.

By Harry C. Oberholser, *Assistant Biologist.*

INTRODUCTION.

The principal waterfowl breeding ground in Nebraska is the sandhill region with its numerous lakes. This area has long been famous as a resort for water birds when migrating; consequently, it has offered great inducements as a hunting ground and has attracted thousands of hunters from all parts of the country, some coming from points as far distant as New York and San Francisco. This region not only harbors myriads of ducks during spring and autumn, but is one of the few extensive waterfowl breeding grounds remaining in the United States. In order to determine the numbers and distribution of the waterfowl of Nebraska, the various breeding grounds in Brown, Cherry, Garden, and Morrill Counties were visited by the writer in June, 1915. Practically all the lakes in central and eastern Cherry County were examined, great assistance being rendered by Mr. U. G. Welker, then postmaster at Dewey Lake, himself an experienced hunter; also a large number of the lakes in Garden and Morrill Counties were visited, and careful observations were made of the water birds living on them. At the Orlando Ranch, in the former county, work was greatly facilitated by the open-handed hospitality of Col. S. Avery, its owner. During October of the same year many of the lakes were revisited; a trip was made to the lakes of the North Platte Irrigation Project, near Scotts Bluff; and a careful examination was made of a considerable section of the Platte River between Grand Island and Silver Creek. Much valuable information concerning the sandhill region and its birds was furnished by Dr. Robert H. Wolcott and Prof. Myron H. Swenk, of the University of Nebraska, who also afforded every possible facility for the prosecution of these investigations.

EFFECT OF FEDERAL PROTECTIVE LAWS.

It is the universal testimony of residents and of sportsmen that the myriads of ducks which in former times frequented the sandhill region, particularly during spring and fall, have been greatly reduced. This diminution is due in part to spring shooting, but also to a number of other causes, including the slaughter of ducks in

great numbers both south and north of Nebraska. The migration flights here, however, are still large and show that there remains a good supply of waterfowl, which with proper protection and reasonable regulation of shooting will continue indefinitely to furnish excellent sport. The breeding waterfowl of the sandhills also have suffered from hunters, particularly in spring. On many of the lakes there are clubhouses owned by sportsmen from cities outside of the county, who were long in the habit of shooting here regularly in spring. As a natural consequence, the breeding ducks were seriously interfered with and very greatly reduced in numbers.

The regulations issued by the Department of Agriculture under Federal laws protecting migratory birds have prohibited spring shooting throughout the United States as a necessary means of protecting ducks during the spring migration and the early part of the breeding season. Since the enactment of the Federal statute of 1913, known as the Federal migratory-bird law, there has been comparatively little spring shooting in the sandhill region, for the law seems to have been very well observed. In fact, there seems to be among the inhabitants of the country much sentiment in favor of the abolition of spring shooting, and in this respect no hostility to the Federal law, for many people who live here seem to regard the ducks as undesirable and unfit for food in spring.

In all the localities that the writer visited he made careful inquiries regarding the effect that the stopping of spring shooting has had on the numbers of waterfowl, particularly ducks. It is very gratifying to note that after the Federal law went into effect ducks began steadily to increase in Nebraska, particularly in the lakes of eastern Cherry County, those about the headwaters of the North Loup River, and at the Cody Lakes. As one resident expressed it, as soon as the ducks find out that they will not be disturbed in spring, they come back in increasingly large numbers.

FUTURE OF WATERFOWL IN THE SANDHILL REGION.

In its natural state—that is, unaffected by the presence of man—the sandhill region of Nebraska is an ideal breeding place for waterfowl. It is, indeed, one of the very best of the remaining breeding grounds. The great number of marshy lakes, with their abundant supply of food, shelter, and breeding places, together with the relative absence of enemies, provide advantages which it would be difficult to surpass; and it would be interesting to know the exact conditions here before the advent of the white man. For various reasons the group of lakes in eastern Cherry County and the lakes of Garden and Morrill Counties are at present by far the most important from the standpoint of protection of ducks on their

breeding grounds, although the other groups of lakes already mentioned, as well as many scattered bodies of water throughout the entire sandhill region, form the breeding ground for comparatively large numbers of birds. The settling up of this region opened the lakes to sportsmen, and they have made good use of their opportunity. Other things being equal, water birds do not thrive in thickly settled sections, and with the laying out of the country into farms they have a natural tendency to disappear, owing to the draining of the lakes and the elimination of their breeding grounds, and also to frequent disturbances during the breeding season. Therefore, one can not reasonably expect large numbers of resident ducks in a thickly settled farming region, for their protection becomes more difficult with the increase of population.

In the sandhill region the early settlements were made chiefly by cattlemen, who took large holdings, and not until the Kinkaid law went into effect was there much general addition to the inhabitants. This law permitted the homesteading of an entire section of land after only three years' residence, and resulted in the taking up of practically all the land in this region, as well as in a great increase of population. A continued increase in the population would seriously menace the future of the breeding waterfowl in this region. Only a very small proportion of the land, however, is suitable for farming, but it all is an ideal cattle range, since the sandhills afford good pasture and the hay meadows of the valleys furnish an abundance of winter feed. Thus, not only is the small landholder usually unable to make a living at farming, but his holdings are likewise too small to make stock raising profitable. Consequently, he is sooner or later constrained to sell out and move elsewhere. From this cause title to the land is gradually drifting into the hands of the large landholders, who in a comparatively short time will probably obtain control of the entire area available for grazing in the sandhills. It naturally follows that the population during the past few years has been growing smaller, and will probably still further decrease; and as the land is not so fit for anything as for stock raising, it is not likely that much change in this respect will take place in the future. Thus a possible menace to waterfowl in a great increase of human population is definitely and doubtless permanently removed. Furthermore, there is here practically no danger of the destruction of the grass from overstocking of the grazing ranges.

In some places, however, other difficulties of greater or less moment are arising. At the group of lakes in Brown County, where the character of the soil is considerably better for farming than in other parts of the sandhills, there is apparently a larger permanent popu-

lation, and many of the best lakes lie close to human habitations and are thus easily accessible, which probably will considerably decrease their value as breeding grounds for waterfowl. This is partially substantiated by the fact that in this place comparatively little increase has been apparent in the number of birds since the Federal protective laws went into effect; while in the more remote regions, such as the lakes of eastern Cherry County, the good results from the law have been very marked. Disappearance of marsh vegetation, following the draining of lakes by ditching for the purpose of converting them into hay meadows, also operates to greater or less extent against the protection of waterfowl. A number of lakes have, in this way, been made undesirable for water birds, and these, too, lakes which were particularly attractive to them. In a few cases, however, the water drawn off has formed other lakes which have in a measure made up for the loss. Draining has been practiced most among the lakes at the headwaters of the North Loup River and in Morrill and Garden Counties, but there is apparently no danger that this will be carried to a much greater extent than at present, nor is it likely to be extended to the lakes of eastern Cherry County, the Cody Lakes, or the lakes of Brown County.

NATURAL ENEMIES.

In the Nebraska sandhill region the waterfowl and game birds have relatively few natural enemies. Hawks are not numerous, and those of most frequent occurrence, such as the marsh hawk, the ferruginous rough-legged hawk, and the Krider red-tailed hawk, do little damage to birds. The prairie falcon and the Cooper hawk, which are well-known enemies of birds, are fortunately not common enough in this region to make their presence of serious import. Perhaps the most destructive enemies are the skunk and the coyote, which often destroy eggs in the nest, occasionally kill the adult birds, and not infrequently catch young ducks and other waterfowl. Another drawback to breeding is the frequent hail storms, which kill ducks and other birds on their nests, break the eggs, and destroy young birds.

Man, of course, is the birds' greatest enemy, and were he but absent from the sandhill region, there would be no problem of game protection. It is almost unnecessary to state, however, that if the pursuit of game were to be continued as recklessly and persistently at all times of the year as before the passage of Federal laws protecting migratory birds, the time would not be distant when there would be no birds to shoot; hence, if the game is to be preserved for the future sportsman, as well as for the naturalist, there must be some effective restrictions. With such advantages as the sandhill

region offers there is little difficulty in inducing water birds to breed in numbers almost anywhere, and when they are not disturbed they become exceedingly tame and unsuspicious. On Dewey Lake, in eastern Cherry County, where the writer remained about two weeks, blue-winged teal and coots, apparently unmindful of the presence of human beings, would come regularly, morning and evening, into a little lagoon in the very yard not over 40 or 50 feet from the house, and on more than one occasion a mallard brought her brood of young there. This, as much as anything, shows how quickly the ducks respond to proper encouragement. At the Palmer Ranch, near the head of the North Loup River, the proprietors regularly feed the ducks and other game birds in autumn, on account of which the birds become almost semidomesticated. Among the ranchmen in general there is apparently an increase in sentiment against hunting on their land, which augurs well for the water-bird population, since the small number of birds taken by the local inhabitants does not seriously affect the numbers of even the breeding species. In line with this, it is interesting to note that where the winding trails that answer for roads in much of this country pass through the fences of the ranch pastures the sign "No hunting!" guards many of the gates.

The shooting of ducks in spring while they are migrating and preparing to settle down to the duties of rearing families has two very injurious results. In the first place, if a female be killed, it means not only the loss of that individual bird but of the 8 to 12 young which she would in the course of a month or two add to the waterfowl population. Secondly, the disturbances caused by frequent visits of hunters and the noise of continual discharging of firearms on the breeding grounds greatly annoy the birds and often prevent their breeding in the neighborhood. In fact, spring shooting had practically driven ducks away from some of the best lakes in the sandhill region. Again, shooting too early in autumn is disastrous, for if the hunting season opens before the young ducks are able to take care of themselves they fall ready victims to the gun of the sportsman, or by the death of their parents they are left to shift for themselves before they are able to gain an independent livelihood. In the sandhill region the breeding season is chiefly during May and June, and practically all the ducks are strong on the wing by the first or middle of September; so that present laws, properly enforced, will give sufficient protection at this season.

The protection and preservation of waterfowl as well as other game is not based wholly, as often seems to be the impression, on the ethical grounds of the preservation of the species, and therefore of interest to the naturalist only; it is also a matter of fundamental

concern to the sportsman, who would have no game to shoot were the birds exterminated. The sportsman therefore is vitally interested in game protection, and should be among the first, as in many places he is, to insist on proper protection for the objects of his sport. So far as the sandhill region of Nebraska is concerned, it is evident that comparatively little effort and restraint on his part will produce excellent and desired results. It is necessary to protect the young birds in autumn by enforcing the law until the open season, and it is particularly necessary to preserve the breeding grounds and protect the birds there in spring and during the breeding season. In other words, the prevention of spring shooting is absolutely essential to the preservation of waterfowl in Nebraska; otherwise there will undoubtedly soon be an alarming decrease in the numbers of wild fowl, and possibly even the extermination of many of the species, at least in so far as they may be considered breeding birds of the State. With proper care, however, there should be an abundance of waterfowl for the continued future enjoyment of the sportsman.

HUNTING GROUNDS.

Autumn shooting of waterfowl in Nebraska is of three kinds—lake, pond, and river. Of the first mentioned, the best is to be found in the lake regions of Brown County, eastern Cherry County, central and northern Cherry County, Garden and Morrill Counties, and at various scattered lakes in the central and western portions of the State. Pond shooting, while possible over more or less of the State, is at its best in the region comprising Adams, Clay, and Fillmore Counties, in the southeastern part of the State. River shooting is best on the Platte River between Ashland in the eastern part of the State and North Platte in the west-central section, particularly between Schuyler and Shelton in the eastern portion of the State. Hunting on the Missouri and on some of the smaller streams is of much less importance.

WATERFOWL HUNTING IN THE AUTUMN OF 1915.

Hunting conditions in Nebraska during the autumn of 1915 were somewhat unusual. This was due to at least two causes: the abnormal rainfall throughout the spring, summer, and the greater portion of the autumn; and, secondly, the accompanying mild fall weather, both in Nebraska and in the regions much farther north. The excessive rainfall not only raised the level of most of the larger lakes and filled the streams of the State, but it also greatly increased the number of small temporary lakes and ponds. Thus the ducks found abundant water almost everywhere in the sandhills, as well as in the wet valleys. This resulted in a much more general dis-

persal of the water birds over the country than usual, especially throughout some of the more important groups of lakes. As a consequence the numbers on any particular lake were naturally not proportionately so large as they otherwise would have been, hence hunting was somewhat more difficult. Another result of the great amount of water in the country was the high stage of most of the streams. This furnished, along the creeks and more sluggish small rivers, a much greater attraction for water birds than is ordinarily the case, since every marsh of any extent along such streams was converted into an excellent resort for the birds. On the other hand, the large rivers, like the Platte and the Missouri, were so full of water that the sand bars, which ordinarily form a resting place for waterfowl, were in large part covered, and the ducks were therefore inclined to seek more congenial feeding grounds in the still water of the ponds in the hills.

Under normal conditions, October is the best month for waterfowl hunting in Nebraska, but owing to the mild weather and consequent late season, the October shooting of 1915 was largely confined to the birds which bred in Nebraska or in regions not far to the north. The flight of northern ducks was not fully under way until after the first of November, and as a consequence the northern species, which ordinarily flock about the lakes, ponds, and rivers of the State during the latter part of October, were conspicuous by their absence, or their comparative scarcity. During the first half of November, however, the birds were present in great numbers, apparently much greater than has been usual for the past few years; and, probably owing to the mild weather which prevailed at this time, tarried in the State longer than ordinarily, many until early December.

Notwithstanding the high water and consequent scattering of the ducks and the lateness of the flight of northern birds, hunting during that month of October was, on the whole, unusually good; much better, I am informed, than it had been for a number of years. On almost all the best hunting grounds it was possible for any hunter without unusual exertion to obtain a good bag of ducks, and a failure was the great exception. This satisfactory condition of the hunting is credited by the gunners and residents of the region to the discontinuance of spring shooting, by which has become possible the increase in the number of ducks reared both in Nebraska and farther north. In conversation with numerous hunters and others interested in hunting and the preservation of the game supply, it was noted that with comparatively few exceptions all were very much in favor of the prohibition of spring shooting, for it seems that they are now realizing what this means to the future game supply.

GENERAL DESCRIPTION OF THE SANDHILL REGION.

The sandhill region of Nebraska is an irregular area lying in the north-central part of the State, extending east and west for about 250 miles, north and south for about 140 miles, and occupying approximately one-fourth of the State. There are also isolated areas in southwestern and in extreme western Nebraska, but these are of little importance from our present standpoint. Roughly speaking, the Niobrara River forms the northern boundary of the region, and, except in the eastern half, the Platte is the southern limit. In general, the face of the country is a succession of hills and valleys containing many lakes and occasional running streams. The hills, which are often steep, are mere piles of light-colored sand, for the most part under 200 feet in height and covered with a more or less luxuriant growth of various kinds of grasses. In most places the sand is fine, and, under the high winds which often prevail, is drifted over roads and fences to such an extent that travel is often interfered with and agriculture made difficult. A curious and characteristic feature of the landscape, produced by these high winds, is locally called a "blow-out": it is a miniature crater in the side or top of a sandhill, which has been made by the continual action of the wind on an exposed portion of the slope. In places these "blow-outs" eat into the hills holes 50 or 60 feet deep and 100 feet or more in diameter, but usually they are much smaller. Aside from grass, the vegetation of these sandhills consists chiefly of yuccas (*Yucca glauca*), which in places closely dot the summits and slopes, at a distance giving to the hills a peculiarly spotted appearance. On some of the smaller hills and on the lower slopes of others there are numerous wild-rose bushes (*Rosa pratincola*). The dwarf "sand cherry" (*Prunus besseyi*) and the pale-foliaged amorpha (*Amorpha canescens*) are also abundant all over the hills; while in places there are also great patches of "buck brush" (*Symphoricarpos*). Showy flowers of various kinds, such as lupines, pentstemons, lithospermums, and others, grow in great profusion.

The valleys between the sandhills are sometimes mere hollows, in character not noticeably different from the sandhills themselves; but the larger and deeper valleys are usually more or less level and occupied either by lakes or by meadows, the rank grass of which furnishes excellent hay.

The lakes, which form one of the most interesting features of this region, and which are of supreme importance for the welfare of the waterfowl, occupy many of the larger valleys. These lakes are scattered all over the sandhill region, but by far the greater number lie in a few groups, of which the most important are the following:

(1) Lakes of eastern Cherry County.

(2) Lakes at the head of the North Loup River.

(3) The Cody Lakes.
(4) Lakes of Brown County.
(5) Lakes of Garden and Morrill Counties.

Many of these lakes are more or less ephemeral, though in recent years the area of a number of the larger lakes has grown and the permanency of the smaller ones inclined to become more certain. During unusually rainy seasons the number of temporary ponds is greatly increased, and sometimes these exist even among the sandhills themselves. All these lakes are relatively small, most of them not over three or four miles long, the largest not over seven miles; and they vary from this down to bodies of water of not more than an acre or two, though few of the smallest are permanent. All are relatively shallow, ordinarily not over a few feet in depth, the greatest depth in any being not over 18 or 20 feet. The water of most of them is fresh, or nearly so, but in a few is rather strongly alkaline. Most of the lakes have no outlet except at very high water, and many of them not even then.

With regard to the character of their shores, these lakes may be divided into four categories: (1) those in which the water is wholly or largely covered with vegetation; (2) those with a moderate amount of marsh or other vegetation growing in the water; (3) those with wholly grassy shores but with little or no visible vegetation in the water; and (4) those with sandy shores and with little or no vegetation growing in the water. Of these four the first two are as a rule most favored by ducks, though on some of the lakes of the other two many ducks are sometimes found.

The vegetation of these lakes, aside from the grassy turf which forms the margin of many, consists chiefly of various kinds of sedges, rushes, and coarse grass, growing chiefly in the water; on some there are also more or less extensive areas grown up to wild "cane" (*Phragmites communis*), cat-tails (*Typha latifolia*), and wild rice (*Zizania palustris*), together with yellow waterlilies (*Nymphaea advena*). These and other plants which furnish food for the ducks are dealt with in Part II of this report.

The few perennial streams of the sandhills, chiefly the heads of rivers, flow, except for the marshy valleys at or near their sources, through canyons which they have cut for themselves in the plain. Most of these canyons, however, are narrow and not of great depth. Within the sandhill region proper there is little vegetation along these streams, though at its edge and in the plains country surrounding it the canyons are usually more or less heavily wooded with oaks, pines, elms, junipers, and other similar trees. In fact, about the only trees of any consequence in the sandhills are the cottonwoods that have been planted about the lakes and near ranches.

The mammals of this region are the characteristic species of the Great Plains. On the upland there are numerous coyotes, thirteen-lined ground squirrels, Kennicott ground squirrels, white-tailed jack rabbits, prairie dogs, badgers, pocket gophers, and long-tailed skunks. About some of the rivers and lakes there are still beavers and a good many minks and raccoons, while apparently the most abundant mammal of the lakes is the muskrat, for its houses are to be seen on almost every permanent body of water. The American antelope, which formerly was abundant in this region, is now rare, though occasionally seen.

The birds of the sandhill region, other than the waterfowl which will be separately and specially treated in the present bulletin, though not of a great many species, are yet fairly numerous. Among the land birds the most conspicuous inhabitants of the reeds and rushes in the marshes about the lakes are the red-winged and yellow-headed blackbirds, while an occasional long-billed marsh wren chatters away from his hiding place among the rank vegetation. In the thickets bordering the lakes and some of the streams the Bell vireo, yellow warbler, and Maryland yellowthroat are to be found. The eastern meadowlark is unusually abundant in most of the valley meadows, while the western meadowlark is equally numerous on the higher lands, though both often occur on the same ground. The eastern meadowlark was traced as far west as Phalarope Lake, in northwestern Garden County, where several individuals were seen and heard on June 22, 1915; and the Hague Lakes, just south of Rush Lake, in northeastern Morrill County, where it was noted as common on June 21. The melodious song of the bobolink may be heard throughout the summer in many of the meadows. Prairie chickens and sharp-tailed grouse are common almost everywhere, both in the sandhills and in the grassy valleys; but the bob-white is everywhere rare. The kingbird and the barn swallow are found about almost all the rather scattered ranches of the region, while the orchard oriole and warbling vireo inhabit less regularly the trees and groves in the same places. The grassy sandhills are almost everywhere inhabited commonly by the vesper and grasshopper sparrows, while the lark bunting, conspicuous by its black and white plumage and marvelous mockingbird-like song, may be seen all over the plains and sandhills. Other common birds of general distribution are the mourning dove, the nighthawk, the horned lark, and the cowbird, and in almost every prairie-dog town the curious-mannered burrowing owl.

LAKES OF EASTERN CHERRY COUNTY.

In the central eastern portion of Cherry County lies a group of about 65 lakes covering an area about 35 miles square. In the middle where the lakes are closest together they are in some cases only a

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FIG. 1.—WILLOW LAKE, EASTERN CHERRY COUNTY, NEBR.

Showing sandy character of shore. Many species of ducks frequent this lake.

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FIG. 2.—DADS LAKE, EASTERN CHERRY COUNTY, NEBR.

Showing grassy shore. A breeding ground for the blue-winged teal.

few rods apart, but toward the periphery they are separated sometimes by several miles. From a high point on the southern side of Dewey Lake, 9 or 10 of the largest lakes can be seen, and many more undoubtedly would be within sight but for the high intervening sandhills. These lakes are mostly without outlets, except at very high water; yet, notwithstanding this, only two or three are strongly alkaline, those most so being Big Alkali Lake, Little Alkali Lake, and Alkali Lake. Nearly all are permanent bodies of water, that is, they do not dry up during the summer, except perhaps during exceptionally rainless seasons. They comprise the largest lakes of all the sandhill region, the biggest being Dads Lake, which is about seven miles long and a mile or so in greatest width. Most of these lakes have shores partially grassy or sandy, but have along their borders at least a small amount of marsh; but Clear Lake, Big Lake, White-water Lake, Beaver Lake, Rat Lake, Corneil Lake, Durbin Lake, Coleman Lake, Harold Lake, Cedar Lake, Belsky Lake, and Alkali Lake have so little that it is of no real importance. Big Alkali Lake, Little Alkali Lake, Willow Lake, Dads Lake, Clear Lake, and Muleshoe Lake, together with some others of less importance, have shore lines partly or wholly sandy, although along most of them there is at least a small stretch of marsh. Other lakes of this group which have a greater or less area of marsh are Dewey Lake, Hackberry Lake, Trout Lake, Watts Lake, Chamberlain Lake, Red Deer Lake, Johnson Lake, Foster Lake, Hanna Lake, Pearson Lake, and Pelican Lake. The most important lakes that are wholly or largely covered with vegetation are Ballard Swamp, the valley known as North, Middle, and South Marsh, Wendler Swamp, Molly Marsh, Twenty-one Lake, the Sweetwater Lakes, South School Lake, West Rogers Lake, and Tate Lake.

So far as its breeding water birds are concerned, this group of lakes is the most important in the sandhills, for, with few exceptions, the various kinds of waterfowl are, in summer, more abundant here than anywhere else in the region. Many species, including several kinds of ducks, are very numerous, and some of the lakes present an exceedingly interesting spectacle during the nesting season. The most frequently observed breeding species throughout this group of lakes are, in the order of abundance, the black tern, blue-winged teal, American coot, American eared grebe, shoveller, pintail, mallard, and Wilson phalarope. Well distributed but less numerous are the killdeer, upland plover, and ruddy duck.

This part of Cherry County is a noted resort for hunters, many of whom go regularly every year to enjoy the unusual advantages for sport which the locality affords. Visiting sportsmen have built clubhouses on many of the lakes for their convenience when hunting. The clubhouses now in existence include the following: Red Deer

Club, at the eastern end of Red Deer Lake; Fremont Club, western end of Red Deer Lake; Long Pine Club, eastern end of North Marsh Lake; Johnstown Club, eastern end of Middle Marsh Lake; Council Bluffs Club, southern side of South Marsh Lake; Hackberry Hunting Club, western end of Hackberry Lake; Valentine Hunting Club, northern side of Molly Marsh Lake; Dewey Lake Hunting Club, western end of Dewey Lake; and Wood Lake Hunting Club, northern side of Dewey Lake.

Throughout this part of eastern Cherry County the level of many of the larger lakes was considerably higher in October, 1915, than in the previous June; and there were many additional ponds and smaller lakes scattered throughout the country. As a consequence, several of the large lakes, which under ordinary circumstances have no outlet, were discharging in a stream of considerable volume. This will have a considerable and more or less permanent effect upon the character of the water in these lakes, some of which by isolation had become rather strongly alkaline and thereby less attractive than before to waterfowl. Water birds, particularly ducks, were numerous throughout these lakes, more so than they had been for several years past at this time, notwithstanding the fact that comparatively few northern ducks were present during the time of our visit. There was not so much hunting, apparently, as usual at this time of year, though at many of the lakes parties were out every day.

Observations were conducted in this group of lakes from June 3 to June 18 and from October 5 to October 12, 1915.

WATER BIRDS OBSERVED JUNE 3–18, 1915.

GAME BIRDS.	NONGAME BIRDS.
Hooded merganser.	Horned grebe.
Mallard.	American eared grebe.
Gadwall.	Pied-billed grebe.
Baldpate.	Forster tern.
Green-winged teal.	Black tern.
Blue-winged teal.	American bittern.
Shoveller.	Great blue heron.
Pintail.	Black-crowned night heron.
Redhead.	Wilson phalarope.
Canvas-back.	Spotted sandpiper.
Ring-necked duck.	Killdeer.
Ruddy duck.	
Virginia rail.	
Florida gallinule.	
American coot.	
Western willet.	
Upland plover.	
Long-billed curlew.	

WATER BIRDS OBSERVED OCTOBER 5–12, 1915.

GAME BIRDS.	NONGAME BIRDS.
Hooded merganser.	Horned grebe.
Mallard.	American eared grebe.
Gadwall.	Pied-billed grebe.
Baldpate.	Loon.
Green-winged teal.	Ring-billed gull.
Blue-winged teal.	Franklin gull.
Shoveller.	Forster tern.
Pintail.	American bittern.
Redhead.	Great blue heron.
Canvas-back.	Black-crowned night heron.
Lesser scaup duck.	Killdeer.
Bufflehead.	
Ruddy duck.	
Little brown crane.	
Sandhill crane.	
American coot.	
Wilson snipe.	

LAKES AT THE HEAD OF THE NORTH LOUP RIVER.

The group of lakes at the head of the North Loup River comprises about 20 bodies of water, in general character very similar to those of eastern Cherry County. They lie within an area of 30 miles east and west and about 10 miles north and south; and, with the exception of the westernmost, are relatively close together, most of them from a quarter of a mile to 3 miles apart. The greater number are permanent, though without outlets and therefore more or less alkaline; a few, such as Brush Lake, Mud Lake, and Jumbo Lake, drain into the North Loup River. Nearly all are relatively small, not over a mile or two in length, several of them even less than half a mile long. Silver Lake, Red Willow Lake, White Willow Lake, and Speckelmire Lake, all of which are excellent duck lakes, have little or no marsh about their borders, and some of these, particularly Silver Lake, have partially sandy shores. The Twin Lakes and Mud Lake have a great part of their margins more or less sandy, and are almost deserted by ducks during the summer. Three of the lakes once having the greatest extent of marsh, and therefore furnishing excellent cover for breeding waterfowl, namely, Brush, Scott Pullman, and Jumbo, have been ditched and drained for the purpose of utilizing their valleys as hay meadows. Some of the other lakes, however, have more or less marsh that is attractive to water birds.

Water birds are here fairly plentiful in summer, though on account of the small number of lakes and the draining of some of the best of these, the region is not of so much importance as either the eastern Cherry County group or the lakes of Garden and Morrill

Counties. The most numerous breeding species, in the order of abundance, are the black tern, American eared grebe, American coot, canvas-back, mallard, ruddy duck, blue-winged teal, shoveller, pintail, and gadwall. Other species fairly well distributed but less numerous are the killdeer, Wilson phalarope, and black-crowned night heron. Other kinds are much more poorly represented.

This locality was visited on June 15, 16, and 17, and the complete list of breeding waterfowl observed is as follows:

GAME BIRDS.	NONGAME BIRDS.
Mallard.	American eared grebe.
Gadwall.	Forster tern.
Blue-winged teal.	Black tern.
Shoveller.	American bittern.
Pintail.	Black-crowned night heron.
Redhead.	Wilson phalarope.
Canvas-back.	Killdeer.
Ring-necked duck.	
Ruddy duck.	
American coot.	
Upland plover.	
Long-billed curlew.	

THE CODY LAKES.

There are three lakes a few miles north of the town of Cody, Nebr., and along the boundary line between the States of Nebraska and South Dakota. They are small and permanent, two of them lying about a mile apart and the third, Clear Lake, situated some 6 miles west of the others. North Cody and South Cody Lakes are each about 2 miles long and from one-fourth to one-half a mile wide, while Clear Lake is an irregular oval body of water about a mile in greatest diameter. All have extensive marshes, while South Cody Lake and Clear Lake have also some sandy shore line.

The most abundant of the breeding water birds at these lakes are the black tern, American eared grebe, American coot, killdeer, blue-winged teal, and pintail.

These lakes were visited on June 1, 1915, and the following list of breeding water birds noted:

GAME BIRDS	NONGAME BIRDS.
Mallard.	American eared grebe.
Baldpate.	Pied-billed grebe.
Blue-winged teal.	Forster tern.
Shoveller.	Black tern.
Pintail.	American bittern.
American coot.	Wilson phalarope.
Long-billed curlew.	Killdeer.

LAKES OF BROWN COUNTY.

The lakes of Brown County number about 25, and lie in the southwestern portion. They are scattered over an irregular area about 10 miles east and west and about 14 miles north and south. Moon Lake, the largest of the group, is about 3½ miles long and somewhat more than half a mile wide at its widest point, but most of the others are much smaller, though Enders Lake, including its "overflow," is some 2 miles in length, and Long Lake even more. Moon Lake, one of the northernmost, is separated from the more southern lakes by several miles, but all the others lie much closer together, usually not over a mile apart, and in many cases much less. While few have outlets, none except Alkali Lake are very strongly alkaline. Most of them are permanent, though a few of the smaller ones dry up during the summer. Moon Lake, Willow Lake, Alkali Lake, Crystal Lake, and Long Lake have little or no marsh about their borders, but Filbrick Lake, Marsh Lake, and the "overflow" of Enders Lake are almost entirely surrounded by heavy growths of water vegetation. Most of the others have at least a small area of marsh. Enders, Marsh, Clear, West Chain, Diamond, and Rat Lakes seem to be the best for ducks, while the Twin Lakes, Crystal, Alkali, Long, and Post (or Clapper) Lakes harbor comparatively few. Post Lake and Long Lake are apparently too near human habitations to be successful breeding grounds for waterfowl, and Willow Lake is too much frequented by fishermen. Crystal Lake furnishes no good breeding or feeding ground, but why the Twin Lakes are not inhabited by more water birds is not apparent.

Water birds are fairly well represented in this region during the summer, though much less so than in eastern Cherry County. Perhaps this is partially accounted for by the more thickly settled condition of the country and by the great amount of hunting in years past. The most abundant species of breeding water birds in this area, in their order, are the black tern, American coot, blue-winged teal, American eared grebe, shoveller, mallard, gadwall, black-crowned night heron, and pintail. Others that are fairly well distributed throughout this region, but less numerous, are the killdeer and the upland plover.

As in eastern Cherry County, the exceptional rainfall of the previous few months had, in the autumn of 1915, raised the level of many of the larger lakes, and in some cases converted a more or less temporary pond or marsh into a permanent lake. Water birds in this section were at that time fairly numerous, though ducks were by no means so abundant as in eastern Cherry County, and from all accounts were little, if any, more so than usual. At the time of our

autumn visit, October 10 and 11, we were told that there had been comparatively little hunting in the neighborhood, and that the several clubhouses which are situated on the shore of Enders Lake had not been in use so far during that season. Hunting on some of the lakes with proper blinds was good, and we were told that most of the hunters who had been out had reported fair success.

WATER BIRDS OBSERVED JUNE 13–15, 1915.

GAME BIRDS.	NONGAME BIRDS.
Mallard.	American eared grebe.
Gadwall.	Pied-billed grebe.
Blue-winged teal.	Franklin gull.
Shoveller.	Forster tern.
Pintail.	Black tern.
Redhead.	American bittern.
Canvas-back.	Black-crowned night heron.
Ring-necked duck.	Wilson phalarope.
Ruddy duck.	Killdeer.
American coot.	
Upland plover.	

WATER BIRDS OBSERVED OCTOBER 10–11, 1915.

GAME BIRDS.	NONGAME BIRDS.
Mallard.	American eared grebe.
Gadwall.	Pied-billed grebe.
Baldpate.	Franklin gull.
Green-winged teal.	American bittern.
Blue-winged teal.	Black-crowned night heron.
Shoveller.	Semipalmated sandpiper.
Redhead.	
Canvas-back.	
Lesser scaup duck.	
Ruddy duck.	
Whooping crane.	
American coot.	

LAKES OF GARDEN AND MORRILL COUNTIES.

The group of some 90 or more lakes in the central and western parts of Garden County, and in the eastern part of Morrill County, extends over an area some 30 miles east and west and 25 miles north and south. Most of them are small, usually not over a mile in length, though Swan Lake is 3 or 4 miles long, and both Crescent and Beaver (or Blue) Lakes are about 2 miles long and a mile or more in width. The lakes in this region lie usually close together, and in most places it is difficult to travel for more than a mile or so in any direction without coming upon a lake. Many of them dry up during the hottest part of the summer and during seasons with little rain.

Practically all are without outlets, though only a few, such as Alkali Lake, about 6 miles east of Moffitt, are more or less alkaline. In general character they are typical sandhill lakes. Some, like Rush Lake, which has been mostly drained, Ed Eldred Lake, and Reno Lake, are largely covered with vegetation and, having little open water, are scarcely more than marshes. Others, like Alkali Lake, have practically no marsh, but sandy or marshy shores; yet many of the lakes even of this character possess some area of marsh. A few, like Beaver Lake and Old Lady Lake, with largely grassy or sandy shores, lie almost entirely surrounded by rather steep sandhills. Such lakes are not very attractive to waterfowl, particularly in summer. Swan Lake, which is a noted duck-hunting ground, particularly in the fall, is probably the best-known lake of this region. It is a crooked lake of not more than half a mile or a mile in greatest breadth and consists really of two lakes connected by a narrow passage. It drains eastward through a small lake called Jones Lake, and has comparatively little good marsh except in its eastern and western portions and along its sluggish outlet. It is, however, apparently a fairly good feeding and breeding ground for ducks in summer. Bean Lake, on which is Orlando, is one of the larger lakes of the region, as well as one of the best for ducks, and has a good fringe of marsh around a considerable portion of its shore. The Hague Lakes have been apparently made permanent by the draining into them of the water from Rush Lake, and while they have not extensive areas of marsh, are good places for ducks, even in the summer. Many of the small lakes, like Crosser Lake, Charlie Lake, and Harrison Lake, are excellent breeding grounds for waterfowl, especially during wet seasons, for they have a good fringe of marsh vegetation. This whole area, and particularly its southern portions, is visited in autumn by ducks in countless numbers and is a renowned hunting ground.

Water birds are fairly numerous in summer throughout this group of lakes, and consist of much the same species that frequent the other sandhill waters. The only species of common occurrence not noted elsewhere in the sandhills is the American avocet, which was found at the Hague Lakes, at Wild Goose Lake, Young Lake, Ed Eldred Lake, Swan Lake, Jones Lake, and Alkali Lake on June 21; and near Trainor Lake, near the Peterson Lakes, and at Phalarope Lake on June 22. The most numerous species here, during summer, in the order of abundance, are the American coot, redhead, American eared grebe, shoveller, blue-winged teal, gadwall, Wilson phalarope, black tern, ruddy duck, pintail, and killdeer. Others that are present in much fewer numbers but fairly well distributed are the mallard, American avocet, and black-crowned night heron.

As was the case with the other groups of Nebraska lakes visited during the autumn of 1915, the amount of water in these was considerably greater than usual at that time of the year, and this condition had a corresponding effect on the waterfowl. Birds in this region were, according to reports which we received, more numerous than is common in the autumn, notwithstanding the fact that the northern birds had not yet put in an appearance in any considerable numbers. Hunting was about as good as usual, although considerably more had been done here than in some of the other places we had visited; hence the birds were more unevenly distributed, having taken refuge on certain of the less-frequented bodies of water. There are comparatively few hunting lodges in this region, but the ranch houses serve this purpose for visiting sportsmen.

WATER BIRDS OBSERVED JUNE 21–22, 1915.

GAME BIRDS.	NONGAME BIRDS.
Mallard.	American eared grebe.
Gadwall.	Forster tern.
Blue-winged teal.	American bittern.
Shoveller.	Black-crowned night heron.
Pintail.	Wilson phalarope.
Redhead.	American avocet.
Canvas-back.	Killdeer.
Ruddy duck.	
American coot.	
Western willet.	
Upland plover.	
Long-billed curlew.	

WATER BIRDS OBSERVED OCTOBER 14–15, 1915.

GAME BIRDS.	NONGAME BIRDS.
Mallard.	American eared grebe.
Gadwall.	Pied-billed grebe.
Green-winged teal.	Ring-billed gull.
Blue-winged teal.	American avocet.
Shoveller.	
Pintail.	
Redhead.	
Canvas-back.	
American coot.	

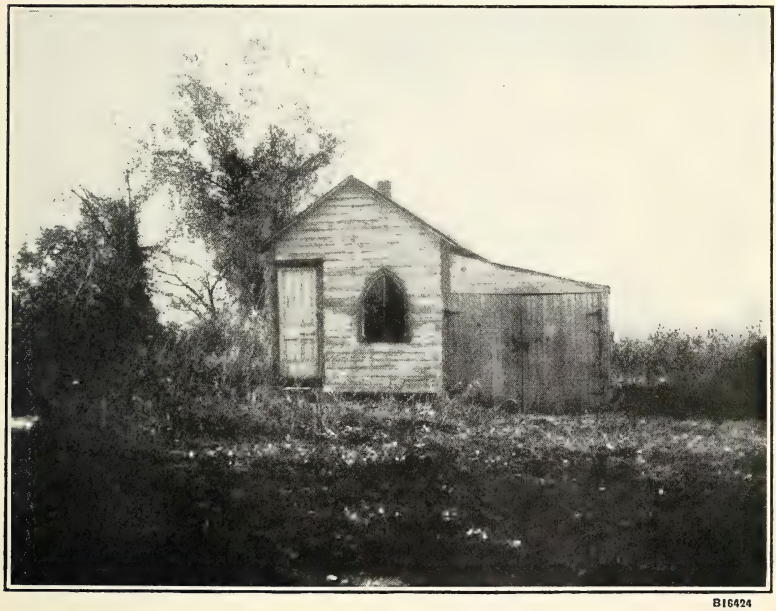
THE PLATTE RIVER.

The Platte River at the time of our visit—October 21–22, 1915—was unusually high for this season, and in many places was running full from bank to bank, covering most of the extensive sand bars and flats that are normally bare. This rendered unavailable much of the

B16403

FIG. 1.—SHIP CREEK, BETWEEN ROUND LAKE AND DUCK LAKE, WESTERN CHERRY COUNTY, NEBR.

A good feeding ground for ducks.



B16424

FIG. 2.—DUCK HUNTERS' CABIN ON THE PLATTE RIVER NEAR GRAND ISLAND, NEBR.

resting grounds for ducks and interfered considerably with river shooting, as most of the ducks had taken refuge back in the hills. A number of hunting parties were seen, however, by whom hunting conditions were reported to be better than usual, even though the northern birds had not yet come down in any considerable numbers. Hunting is carried on here chiefly by building blinds on the small, low islands and sand bars of the river, and there is practically no shooting from the shore. We saw a considerable number of hunting lodges scattered along the river all the way from Grand Island to Schuyler, most of them situated on the banks, but some built on islands that were above the reach of the water even at flood stage. Owing to the conditions above mentioned and to the fact that our visit was cursory and most of it late in the day, comparatively few waterfowl were seen. Even under normal conditions the ducks along the river are best observed early in the morning, since they retire to rest during the later hours of the day; and they do not seem to be as active, except in the morning, as they are about the ponds and lakes. The following birds were noted:

GAME BIRDS.

Mallard.	Shoveller.
Gadwall.	Pintail.
Green-winged teal.	Canada goose.

LAKES OF THE NORTH PLATTE IRRIGATION PROJECT.

The three artificial lakes of the North Platte Irrigation Project have been in existence a comparatively short time, but they are apparently the resting place for some numbers of waterfowl on their migration, and possibly in due time will attract a number of breeding birds. All have grassy shores without rushes or marshes about their borders, and all, particularly Winter Creek Lake, are said to be frequented by ducks in considerable numbers during fall and spring, but very little in summer. Some hunting used to be done here, but, as there is no cover about the lake margins, the ducks are not easily shot. These lakes were visited on October 19, and on this date very few water birds of any kind were seen, it apparently being an unfavorable day for birds on lakes exposed, as are these, to the high wind. Probably at other times the conditions and results would have been more favorable. The only water birds observed were as follows:

GAME BIRDS.

Green-winged teal.	Canvas-back.
Redhead.	Lesser scaup duck.

ANNOTATED LIST OF WATER BIRDS IN THE SANDHILL AND PLATTE RIVER REGIONS OF NEBRASKA.

The following list comprises all the water birds known to breed in the sandhill region of Nebraska. Those not met with by the writer are indicated by a dagger (†). With these are included those observed by the writer during June and October, 1915, in the sandhills and in the Platte River region; and such of these as are not known to breed in the State are indicated by an asterisk (*). The annotations are nearly all from the writer's observations. Autumn notes are placed in separate paragraphs.

Game Birds.

*** RED-BREASTED MERGANSER.** *Mergus serrator.*

A single female on Pelican Lake, June 10, and another on Big Lake, June 7, both in eastern Cherry County, were the only ones observed.

HOODED MERGANSER. *Lophodytes cucullatus.*

This is one of the rarest summer ducks in the sandhill region, where it frequents chiefly the lakes. The writer's only records are a single bird seen on Dewey Lake, June 12; 2 seen on Dads Lake, June 18; 2 on Mud Lake, in eastern Cherry County, June 8; and 1 on Alkali Lake, in southeastern Cherry County, June 18.

In eastern Cherry County 1 was seen on Red Deer Lake, October 6; 2 shot on Pelican Lake, October 7, and 2 on October 8; 6 seen on Shoveller Lake, October 8; and 11 on White Water Lake, October 12.

MALLARD. *Anas platyrhyncha.*

Though not so abundant as some of the other breeding ducks, the mallard is numerous and well distributed, except in the lakes of Garden and Morrill Counties, where in summer it is much less frequent. It was noted at nearly all the eastern Cherry County lakes and was especially numerous at Dewey Lake, June 3 to 18; Pelican Lake, June 10; Big Lake, June 7; Marsh Lake, June 8; Trout Lake, June 11; Durbin Lake, June 10 and 12; and the easternmost of the Sweetwater Lakes, June 12. Four were noted on South Cody Lake, June 1; and the species was common at most of the Brown County lakes, especially on Enders Lake and Marsh Lake, June 13 and 14. At Speckelmire Lake, near the head of the North Loup River, a flock of 45 was seen on June 16; and the species was observed on the same date at Red Willow Lake, Duck Lake, Round Lake, and Silver Lake of the same group. At the lakes of Garden and Morrill Counties it was less numerous, though fairly well distributed, the largest number (30) being seen on Moffitt Lake, June 21. It was also common on Swan Lake on June 21; Bean Lake, June 21 and 22; Trainor Lake, June 22; and the Peterson Lakes, June 22. This species inhabits both the lakes and the surface ponds, and is one of the best known of all the ducks in this region. A nest containing 9 eggs was seen on June 4 on a high sandhill along the south side of Dewey Lake. This was placed on the ground amid the high grass and yucca plants and was exceedingly well concealed. It afterwards was broken up, however, apparently by a skunk or coyote. Two other

B16341

FIG. 1.—HILL ON SOUTH SIDE OF DEWEY LAKE, EASTERN CHERRY COUNTY, NEBR.

Site of mallard's nest, June 4, 1915.

B16367

FIG. 2.—SANDHILLS COVERED WITH WILD ROSES, SOUTH MARSH LAKE, EASTERN CHERRY COUNTY, NEBR.

A good breeding ground for some species of wild ducks.

nests were found on June 18 in the grass close to the edge of Chamberlain Lake, in southeastern Cherry County, one containing 8, the other 3 eggs. In both cases the female was flushed from the nest. Two broods of 6 and 9 small young, respectively, were seen following their parents at Marsh Lake, in Brown County, June 13; and another brood of 9 young at Enders Lake on the following day. Late in the afternoon of June 14 a female mallard brought its brood of 11 small young into the lagoon close to our house at Dewey Lake and remained there for a considerable time, apparently undisturbed by the presence of several people.

The mallard was also abundant throughout the lake region of eastern Cherry County from October 6 to 9; and at Moon Lake in Brown County, October 10; on October 11, 100 were seen on Twin Lake, 5 at Rat Lake, and 10 on Long Lake, all in Brown County. The species was abundant throughout the lake region of Brown and Morrill Counties, October 14 and 15. Along the Platte River south of Central City two flocks, one of 100 and another of 75, were seen on October 21, and the species was said by hunters to be tolerably common all along the river.

GADWALL. *Chaulelasmus streperus.*

The gadwell is another abundant breeding duck in this region, though in most places not so numerous as the mallard. It was not noted at the Cody Lakes, though it doubtless occurs there, but about the lakes of Garden and Morrill Counties it was in summer many times more abundant than the mallard. It was found most numerous on Pelican Lake, June 10; Dads Lake, June 7 and 10; Belsky Lake, June 12; Muleshoe Lake, June 7; North, Middle, and South Marsh, June 8; Enders Lake, June 13 and 14; Speckelmire Lake, June 16; Moffitt Lake, in Garden County, on June 21; and the three Hague Lakes, in Morrill County, on June 21. It was seen mostly about the margins of the lakes, in small ponds and roadside pools, usually in pairs, but occasionally in small companies.

From October 6 to 9 it was abundant on most of the lakes in the east Cherry County group. Twenty-five were seen on Long Lake, Brown County, October 11; 100 on Peterson's Willow Lake, Garden County, October 14; and 15 on Reno Lake on the same day. It was reported by hunters to be tolerably common on the Platte River from Grand Island to Silver Creek, October 20 to 22.

BALDPATE. *Mareca americana.*

The baldpate is one of the rare ducks, at least in summer. It was noted as follows: three individuals at South Cody Lake on June 1; 3 at Punch Bowl Lake, southwest of Dads Lake, on June 7; 1 at Muleshoe Lake on June 7; and 2 at Hay Lake on June 11.

One was seen on Dewey Lake, eastern Cherry County, October 7, and another on the following day; 3 were noted on West Twin Lake and 5 on south Marsh Lake, Cherry County, October 8. Fifty were observed on Long Lake, Brown County, October 11.

GREEN-WINGED TEAL. *Nettion carolinense.*

This is another rare bird during the breeding season in the Nebraska sandhill region. We observed it at this time only among the lakes of eastern Cherry County. Two were seen at Duck Lake, June 5; 5 on Pelican Lake, June 10; 2 on Molly Marsh, June 11; 2 on Twenty-one Lake, June 12; and 1 at Tate Lake, June 18.

It was abundant everywhere throughout eastern Cherry County, October 6 to 9, 1915; common on several of the lakes in Brown County, October 10 and 11; and abundant everywhere throughout the lakes in Garden and Morrill Counties, October 14 and 15. Seventy-five were seen on Winter Creek Lake, near Scotts Bluff, October 19. The species was said to be very common on the Platte River, October 20 to 22, but we saw none.

BLUE-WINGED TEAL. *Querquedula discors.*

This little duck is one of the best known of all the waterfowl of this region, as is not unnatural from its abundance and wide distribution. It lives wherever there is sufficient water in which to swim—in lakes, large and small, in ephemeral ponds, in ditches, and in roadside pools. It is fond of remaining in the grass, rushes, or reeds about the margins of the lakes, and is not so frequently as some other ducks seen riding the waves out in the wide expanses of open water. In summer it is one of the least suspicious of ducks, and, where not disturbed, may be readily approached. It breeds in numbers throughout the sandhill region, particularly about the lakes of eastern Cherry County, placing its nests on the ground amid the grass, usually not at a great distance from the water. A nest containing 12 eggs was found by the writer on the shore of South Cody Lake on June 1. Others were noted as follows: Three, containing, respectively, 5, 10, and 10 eggs, near the margin of Willow Lake, June 4; one containing 12 eggs, in the grass at Dewey Lake, June 5; one with 11 eggs, at Pelican Lake, June 10; one with 7 eggs, on Molly Marsh, June 11; and one containing 11 eggs near Teal Lake, south of Reno Lake, Garden County, June 22. No broods of young following their parents were seen; so it is fair to assume that these did not begin to appear until about the first of July.

In most places in the sandhills this is, during the breeding season, by far the most abundant and one of the most generally distributed ducks, although in Garden County it is outnumbered by both the redhead and the shoveller. Of the lakes of eastern Cherry County visited in summer it was absent from only three, and from but one of those of Brown County. It was most abundant at Pelican Lake, June 10; Willow Lake, June 4; Dewey Lake, June 3 to 18; Trout Lake, June 11; Red Deer Lake, June 8; Big Lake, June 7; North, Middle, and South Marsh, June 8; Clear Lake, June 4; Big Alkali Lake, June 9; Molly Marsh, June 11, and Muleshoe Lake, June 7. In the other groups of lakes it was less numerous, but still common on South Cody Lake, June 1; Enders Lake, June 13 and 14; Moon Lake, June 13; Marsh Lake, Brown County, June 13 and 14; Diamond Lake, Brown County, June 14; Speckelmire Lake, near the head of the North Loup River, June 16; White Willow Lake, June 16; Red Willow Lake, June 16; the Peterson Lakes, in Garden County, June 22; Reno Lake, June 22; Swan Lake, June 21; Bean Lake, June 21 and 22; Teal Lake, south of Reno Lake, June 22; Phalarope Lake, June 22; and Wild Goose Lake, June 21.

It was tolerably common throughout the lake region of eastern Cherry County, October 6 to 9, and the writer saw 3 at Moon Lake, Brown County, October 10; 3 on Goose Lake, Garden County, October 14; and 3 on Roundup Lake, October 14.

SHOVELLER. *Spatula clypeata.*

One of the best-known ducks in this region, the shoveller is also one of the most beautiful. Like the blue-winged teal, it frequents almost any body of water, however small, and often rises from roadside pools as teams drive along. Though frequently seen out in the open water of the larger lakes, it

remains much of the time along their margins among the vegetation, whence, like the blue-winged teal, it gracefully paddles out into open water when disturbed. Like most of the other ducks, it is fond of sunning itself on the sandy, muddy, or grassy shores of the lakes, and is observable often in considerable companies thus resting. In June it is largely in pairs, though many males are sometimes seen together or singly, the females being probably engaged elsewhere in nesting duties.

Next to the blue-winged teal, the "spoonbill," as this beautiful bird is commonly called, is in summer the most abundant duck throughout almost all of the sandhill region. It is likewise well distributed, as may be inferred from the fact that we saw it at all but six of the lakes in the eastern Cherry County group and at all but three of the Brown County lakes. In the other lake groups it was well-nigh as evenly distributed. Of the lakes in eastern Cherry County it was most abundant at Corneil Lake, June 9; Belsky Lake, June 12; Muleshoe Lake, June 7; North, Middle, and South Marsh, June 8; Pelican Lake, June 10; Clear Lake, June 4; the Sweetwater Lakes, June 12; and Red Deer Lake, June 8. In Brown County most shovellers were seen on Diamond Lake, June 14; Enders Lake, June 13 and 14; Moon Lake, June 13; and Rat Lake, June 14. The species was less numerous about the lakes at the head of the North Loup River, but was common at Speckelmire Lake and in a marsh near White Willow Lake. It was one of the most abundant ducks in Garden County, and was observed most numerously at Moffitt Lake, June 21; the three Hague Lakes, June 21; Phalarope Lake, June 22; Swan Lake, June 21; and Alkali Lake, June 21. It was also noted at South Cody Lake, June 1.

It was abundant on nearly all the lakes in eastern Cherry County, October 6 to 9. Five were seen on Rat Lake, Brown County, October 11, and 50 at Long Lake on the same day. It was abundant on most of the lakes in Garden and Morrill Counties, October 14 and 15; and hunters reported it common on the Platte River, October 20 to 22.

PINTAIL. *Dafila acuta tzitzihoa.*

The pintail is one of the three most numerous breeding ducks of the sandhill region. Found on all the bodies of water, even the roadside pools, it is fond of sitting in the grass by the margins of the lakes with its long neck extended, in which characteristic pose it is readily distinguishable from the other waterfowl. During summer it was not often seen out in the open water of the larger lakes, but seemed to prefer the grassy and reedy marshes and the swamps, as well as the grassy pools. The pintail breeds earlier than the other ducks of this region, and at the time of our visit a large part of the eggs had apparently hatched. We found, however, one nest of nine eggs at Dewey Lake, June 6, and another of seven at Belsky Lake, in eastern Cherry County, June 12. Both were at the edge of the sandhills near the lakes and were mere depressions in the ground lined with down and a little grass. Broods of 1 to 12 small young following their parents were seen on many of the lakes. Nine such family companies were seen on Muleshoe Lake, June 7; and 7 on Pelican Lake, June 10. A brood of 12 was noted on Dewey Lake, June 10, and others on June 5 and 12. Other broods were seen as follows: one on Long Lake, eastern Cherry County, June 5; one at Mallard Lake, June 7; one at Reservoir Lake, June 7; one containing 11 young at Big Lake, June 7; one at Johnson Lake, June 8; and one at Big Alkali Lake, June 9. A brood of 6 young was found with the female on South Cody Lake on June 1; and a brood of 8 young at Long Lake, in Brown County, June 13. The mother bird, when surprised with her young in the water or at the edge of a lake, usually remains in the water and leads the young toward the open lake;

but if at any distance from open water she usually leaves the young to scatter and hide while she attempts to lure away the supposed enemy.

This bird is well distributed over all the groups of lakes visited. It was found most numerous at Pelican Lake on June 10; at Muleshoe Lake, June 7; at Dewey Lake, June 3 to 18; at Smith Lake, June 10; West Twin Lake, June 8; Mallard Lake, June 7; Corneil Lake, June 9; Trout Lake, June 11; and Big Lake, June 7. In fact, it was absent from only eight of the lakes visited in eastern Cherry County and was common at most of the others, including Clear Lake, June 4; Willow Lake, June 4; Dads Lake, June 7; Marsh Lake, June 8; Red Deer Lake, June 8; Ballard Swamp, June 8; L Lake, June 9; Molly Marsh, June 11; the Sweetwater Lakes, June 12; Twenty-one Lake, June 12; and Alkali Lake, June 18. It was also common at the South Cody Lake on June 1; at West Chain Lake, Brown County, June 14; at Moon Lake, June 13; at White Willow Lake, near the source of the North Loup River, June 16; and at Silver Lake, in the same region, June 16. In Morrill County it was common at the Hague Lakes and was noted near Alliance on June 21. In Garden County it was common at Moffitt Lake, June 21; at Silver Lake, June 21; at Bean Lake, June 21 and 22; at Reno Lake, June 22; at the Peterson Lakes, June 22; at Phalarope Lake, June 22; and at Bignell Lake, June 22. We observed it also at several of the other lakes of this region.

On the lakes in eastern Cherry County this duck was common, October 6 to 9; and tolerably common in Garden and Morrill Counties, October 14 to 15. Nine were seen along the Platte River south of Chapman, October 21; and three were seen on the same river south of Silver Creek, October 22. Four shot by hunters near Grand Island, October 20, were seen at a hunting lodge, and the species was reported by hunters to be common.

REDHEAD. *Marila americana.*

This much-hunted duck was seen at the time of our June visit mostly in small flocks and chiefly in the open water of the larger lakes, though also on some of the smaller bodies of water as well. It is one of the ducks that have very greatly increased since the abolition of spring shooting, and it is now very much more numerous as a breeding bird in this region than it was a few years ago. It is common and well distributed during summer in the lakes of eastern Cherry County and of Garden and Morrill Counties, but is much less frequent in other parts of the sandhill region. It is by considerable the most numerous of all the ducks at this season in Garden County and also here more abundant than in any other part of Nebraska. On Bean Lake the writer saw 99 on June 22, and the species was also abundant on the Hague Lakes, June 21; Moffitt Lake, June 21; and common on the Peterson Lakes, June 22; Teal Lake, south of Reno Lake, June 22; Trainor Lake, June 22; Wild Goose Lake, June 21; and Swan Lake, June 21. In eastern Cherry County it was abundant at North, Middle, and South Marsh on June 8; Muleshoe Lake, June 7; Ballard Swamp, June 8; Johnson Lake, June 8, and Dewey Lake, June 3 to 18; also common on Clear Lake, June 4; Red Deer Lake, June 8; Hay Lake, June 8; the Cumbow Lakes, June 11; Foster Lake, June 9; Wendler Swamp, June 10; and Molly Marsh, June 11. It was common on West Chain Lake, in Brown County, June 14; and was noted on Enders Lake, June 14, and on Moon Lake, June 13. Of the lakes at the source of the North Loup River, it was seen only on White Willow Lake, where common, and on Red Willow Lake and Silver Lake, all on June 16. It was not observed on any of the Cody lakes.

Throughout the lake region of eastern Cherry County this duck was common, October 6 to 9. Fifty were seen on Long Lake, Brown County, October 11;

and 500 on Moon Lake, October 10. In Garden and Morrill Counties it was one of the most abundant ducks about the lakes, October 14 and 15; and we saw 100 on Lake Alice, near Scotts Bluff, October 19.

CANVAS-BACK. *Aristonetta valisineria.*

The famous canvas-back duck is fairly common, but of irregular distribution, throughout the sandhill region in summer; and, like the redhead, has very much increased during the past few years. It is most numerous on the lakes at the head of the North Loup River. Here, on June 16, 62 were seen on Silver Lake; 39 on White Willow Lake; and 14 on Red Willow Lake. It was seen, also, at Moon Lake, Brown County, June 13; at West Chain Lake and at Rat Lake, Brown County, June 14. At Trout Lake, in eastern Cherry County, 29 were seen on June 11; and of the other lakes in eastern Cherry County it was noted at Watts Lake, June 5; Little Alkali Lake, June 7; Middle Marsh Lake, June 8; Hay Lake, June 8 and 11; Big Alkali Lake, June 9; Molly Marsh, June 11; Twenty-one Lake, June 12; and Alkali Lake, June 18. In Morrill County a few were seen at the Hague Lakes, June 21, and at Young Lake on the same date. In Garden County it was observed at Moffitt Lake, June 21; Ed Eldred Lake, June 21; Eldred Lake, June 22; and at Trainor Lake on the same date. Like the redhead, this duck occurs most commonly on the larger lakes, where it frequents much the open water, usually in company with other ducks, such as the redhead and ruddy, and with the American eared grebe.

In eastern Cherry County from October 6 to 9, the canvas-back was common on some of the lakes. Two hundred and fifty were seen on South Marsh Lake, October 8, and 500 on Red Deer Lake, October 5. Fifty were observed on Long Lake, Brown County, October 11; 25 on Peterson's Willow Lake, Garden County, October 14, among a much greater number of other ducks, and a flock of 15 was found on Lake Minitare, near Scotts Bluff, October 19.

*** LESSER SCAUP DUCK.** *Marila affinis.*

On June 1, 17 were counted on the open water of South Cody Lake, and 5 on Clear Lake, west of Cody Lake; and on June 5, 7 on Watts Lake, in eastern Cherry County. These seemed to be belated migrants, though it is barely possible that the species occasionally breeds in this region. No others were seen in summer.

Five were seen on Alkali Lake, in eastern Cherry County, October 8; 4 on Dewey Lake, October 12; and 15 on Dads Lake on the same date. Fifty were observed on Long Lake, Brown County, October 11, and 55 on Winter Creek Lake, near Scotts Bluff, October 19.

RING-NECKED DUCK. *Marila collaris.*

The ring-neck is one of the rarer ducks of this region, but we observed it in June at all the groups of lakes, excepting the Cody Lakes and the lakes of Garden and Morrill Counties, and it doubtless occurs there, at least occasionally. It was seen on Wood Lake on May 31; Willow Lake, eastern Cherry County, June 4; Muleshoe Lake, June 7; Mud Lake, June 8; East Twin Lake, eastern Cherry County, June 8; Red Deer Lake, June 8; the Sweetwater Lakes, June 12; Twenty-one Lake, June 12; Alkali Lake, June 18; West Chain Lake, Brown County, June 14; and Red Willow Lake, near the head of the North Loup River, June 16. It was most frequently observed out in the open water, and in pairs or singly, the single birds being chiefly males.

*** BUFFLE-HEAD.** *Charitonetta albeola.*

One seen on Pelican Lake, October 12, and 3 on Dewey Lake, October 6.

RUDDY DUCK. *Erismatura jamaicensis.*

The ruddy duck was, during summer, one of the interesting sights of the lakes in this region, where it frequented the open water of both ponds and the larger bodies of water, often gathering into companies of considerable size, and regularly associating with other ducks. Its curious habit of sailing about with tail elevated makes it easy to distinguish, even at a considerable distance. Most of the birds seen at this time were either pairs or single males, and such kept more or less separate, even when associated together in a flock of 25 to 50, as was not infrequently the case.

This is one of the common and well-distributed breeding ducks, except in Brown County, where it seems to be rare, and at the Cody Lakes, where we did not see it at all. It was most numerous on Silver Lake, near the head of the North Loup River, June 16; at Dewey Lake, June 3 to 18; Muleshoe Lake, June 7; Red Deer Lake, June 8; Hay Lake, June 8 and 11; Dads Lake, June 7; and East Twin Lake, eastern Cherry County, June 8. It was noted also at Wood Lake, May 31; Clear Lake, June 4; Big Lake, June 7; Marsh Lake, June 8; L Lake, June 9; Big Alkali Lake, June 9; Welker Lake, June 11; Chamberlain Lake, June 18; Pearson Lake, June 18; and at several of the other lakes in eastern Cherry County. Near the head of the North Loup River it was seen on June 16 at Speckelmire, White Willow, and Red Willow Lakes. The only lake in Brown County at which it was observed was Rat Lake, on June 14. In Brown and Morrill Counties it was fairly common at a number of the lakes, particularly Beaver Lake, Swan Lake, Harrison Lake, Ed Eldred Lake, Wild Goose Lake, and the Hague Lakes, all on June 21.

In eastern Cherry County it was common almost everywhere, October 6 to 9. Ten were observed on Moon Lake, in Brown County, on October 10.

CANADA GOOSE. *Branta canadensis canadensis.*

This species, I am credibly told, formerly bred in the sandhill region, but I could get no information that it has done so during the last few years; and it is probably now entirely absent at this season, though, of course, it occurs during the migrations.

A flock of 100 was seen along the Platte River, near Silver Creek, October 22. Hunters told me of shooting one near Grand Island on October 18.

† **TRUMPETER SWAN.** *Olor buccinator.*

The trumpeter swan was formerly a breeding bird of this region, but, if not now entirely extinct as a species, can no longer be numbered among the summer birds of Nebraska.

WHOOPING CRANE. *Limnogeranus americanus.*

A flock of three was seen flying over Post Lake, Brown County, late in the afternoon of October 10, 1915.

* **LITTLE BROWN CRANE.** *Grus canadensis canadensis.*

Two were seen five miles east of Red Deer Lake, eastern Cherry County, on October 5, 1915.

SANDHILL CRANE. *Grus canadensis mexicana.*

The sandhill crane formerly reared its young in the sandhills of Nebraska, but probably is not now breeding there.

A flock of 20 was seen near Wood Lake, in eastern Cherry County, October 5, 1915, and four flying over Willow Lake, October 10.

B16384

FIG. 1.—NEST OF COOT (FULICA AMERICANA AMERICANA).

Photograph taken at Pelican Lake, eastern Cherry County, Nebr., on June 10, 1915.

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FIG. 2.—NEST OF PINTAIL (DAFILA ACUTA TZITZIHOA).

Photograph taken at Dewey Lake, eastern Cherry County, Nebr., on June 5, 1915.

† **KING RAIL.** *Rallus elegans.*

This species has bred at Trout Lake and at some of the other bodies of water in this region, but is apparently rare.

VIRGINIA RAIL. *Rallus virginianus.*

This rail seems to be rare, though known to many inhabitants of the region. We saw it only in eastern Cherry County—two in the marshes bordering Dewey Lake, one at Hackberry Lake, and one at Watts Lake, all on June 5; and two at Big Alkali Lake, June 9.

† **SORA.** *Porzana carolina.*

The sora is a breeding bird of the lakes, but is apparently everywhere rare.

* **YELLOW RAIL.** *Coturnicops noveboracensis.*

A single bird seen in the marsh on the north shore of Pelican Lake on June 10 was the only individual noted. The lateness of this date indicates that the species may possibly once in a while remain to breed in the sandhill country.

FLORIDA GALLINULE. *Gallinula chloropus cachinnans.*

This is apparently a rare bird here. We found it only at Hackberry Lake, eastern Cherry County, where we saw two on June 5, 1915.

AMERICAN COOT. *Fulica americana americana.*

This species was found in summer at all the lakes, both large and small, wherever there was a sufficient growth of rushes, reeds, or other vegetation about the shores to offer opportunity for concealment and for nesting. It was breeding numerously during June. Of 4 nests found on Pelican Lake, June 10, the only one examined contained 6 eggs. On West Cumbow Lake, which has very little open water, but is largely marsh and of limited extent, we noted 8 nests on June 11; and on Welker Lake, which has still less suitable vegetation, we noted 4 nests on the same date. At the third Sweetwater Lake, on June 12, we found, without special search, 11 nests, one of which contained 10 eggs. Undoubtedly careful search would reveal hundreds of nests of this species on the lakes of this region. Although June seems to be its chief breeding season, this species apparently begins to nest in early May, as indicated by a brood of five small young seen on Hackberry Lake, eastern Cherry County, June 5. Considering the value of its flesh as food, it is rather surprising that so much prejudice exists against this bird as an object of sport.

Next to the black tern, this well-known bird, commonly called mud-hen, is in summer the most numerous of all the kinds of waterfowl in the sandhill region, and on some of the small lakes almost incredibly numerous. On Pearson Lake 179 were counted on June 18; and on Marsh Lake, Brown County, a lake barely three-quarters of a mile long, 89 were counted on June 13. Other lakes on which it was very abundant are Red Deer Lake, June 8; Pelican Lake, June 10; the third Sweetwater Lake, June 12; Lee Lake, June 18; Hackberry Lake, June 5; Dewey Lake, June 3 to 18; Willow Lake, June 4, all in eastern Cherry County; Speckelmire Lake, June 16; White Willow Lake, June 16; Red Willow Lake, June 16; Silver Lake, June 16, all at the head of the North Loup River; Eldred Lake, June 22; Swan Lake, June 21; and the Peterson Lakes, June 22, all in Garden County.

About the lakes in eastern Cherry County this bird was the most abundant species of waterfowl from October 6 to 9, 1915, and we noted it at practically all the lakes. Nineteen hundred were observed at Pelican Lake, alone, on October 12. Likewise, on the lakes of Brown County, October 10 to 11, it was

by far the most abundant water bird, and was seen on nearly all the lakes visited. On Enders Lake 2,500 were noted, October 11. On most of the lakes of Garden and Morrill Counties it was also abundant, October 14 to 15.

WILSON SNIPE. *Gallinago delicata.*

This well-known game bird was common throughout eastern Cherry County in most of the wet valleys and in the vicinity of the lakes, October 6 to 9, 1915.

*** LESSER YELLOW-LEGS.** *Totanus flavipes.*

Seven were seen at South Cody Lake on June 1; 3 on the upper part of Gordon Creek a few miles north of Simeon, June 3; and one on Hackberry Lake, eastern Cherry County, June 5. No others were noted.

WESTERN WILLET. *Catoptrophorus semipalmatus inornatus.*

This noisy shore bird is tolerably common during summer in the lake region of eastern Cherry County and of Morrill and Garden Counties, but we did not observe it elsewhere. We saw it on Willow Lake, eastern Cherry County, June 4; Pelican Lake, June 5; Mallard Lake, June 7; Dads Lake, June 7; Muleshoe Lake, June 7; West Twin Lake, June 8; Ballard Swamp, June 8; Johnson Lake, June 8; Trout Lake, June 11; Big Alkali Lake, June 9; and, of the lakes in Garden County, Moffitt Lake, June 21; Eldred Lake, June 22; Alkali Lake, June 21; Bean Lake, June 21; and Teal Lake, June 22. It was noted almost always singly or in pairs about the marshes, meadows, or the margins of the lakes.

UPLAND PLOVER. *Bartramia longicauda.*

The upland plover is, during summer, a tolerably common and fairly well-distributed bird in the sandhill region, though nowhere abundant. It is most numerous in eastern Cherry County, where we saw it about many of the lakes, including Dewey Lake, June 3 to 18; Hackberry Lake, June 5; Pelican Lake, June 10; Muleshoe Lake, June 7; Big Lake, June 7; Red Deer Lake, June 8; Trout Lake, June 11; Corneil Lake, June 9; Big Alkali Lake, June 9; Wendler Swamp, June 10; the Sweetwater Lakes, June 12; Twenty-one Lake, June 12; and Chamberlain Lake, June 18. In Brown County it was noted at Post Lake, June 13; Filbrick Lake, June 13; Enders Lake, June 14; Marsh Lake, June 13; Long Lake, June 14; Alkali Lake, June 14; and Rat Lake, June 14. Near the source of the Loup it was noted only near White Willow Lake and at Brush Lake, both on June 16. In Garden County it was seen at Reno Lake, June 22; Teal Lake, June 22; and near Trainor Lake, June 22. It was not seen at all about the Cody Lakes.

This species in summer frequents chiefly the meadows and marshes about the lakes and in the moist valleys, being entirely absent from the drier parts of the sandhills. So far as we observed its habits, its name " upland " plover is a misnomer in this region, for it seemed greatly to prefer the wet ground and frequently waded in the waters of the marshes near the margins of the lakes. According to the testimony of residents it is much less numerous than formerly.

LONG-BILLED CURLEW. *Numenius americanus americanus.*

Though formerly abundant in the sandhill region, the long-billed curlew is at present apparently uncommon during summer. We observed it as follows: one at Long Lake, eastern Cherry County, June 17; 1 at Pelican Lake, June 10; 1 at Little Alkali Lake, June 17; 4 at Dads Lake, June 7; 4 at Reservoir Lake, west of Dads Lake, June 7; 3 at Punch Bowl Lake, southwest of Dads

Lake, June 7; 1 at White Willow Lake, near the source of the North Loup River, June 16; 3 on the Hague Lakes, in Morrill County, June 21; and 1 on Jones Lake, east of Swan Lake, Garden County, June 21. This bird was seen both in the hills in the vicinity of the lakes and along the shores near the water.

Nongame Birds.

† WESTERN GREBE. *Aechmophorus occidentalis.*

The western grebe was found nesting at Island Lake, Garden County, in June, 1916.

HORNED GREBE. *Colymbus auritus.*

This grebe, during summer, is apparently very rare in the sandhill region, as the writer saw but a single individual in June, this in a small pond close to Corneil Lake, north of Big Alkali Lake, on June 9, 1915.

One was seen on Clear Lake, eastern Cherry County, October 9, 1915.

AMERICAN EARED GREBE. *Colymbus nigricollis californicus.*

The American eared grebe, so far as we observed it, stayed principally in the open water, though of course at times among the rushes, and apparently is fond of swimming about and diving far out in the middle of the lakes. Its habit of holding the neck and crest erect makes it easy to distinguish even at a distance.

This is one of the most abundant of the summer water birds in the region, and breeds on many of the lakes. The writer counted 349 on Dads Lake on June 7, 305 of them in a single company. On White Willow Lake, near the head of the North Loup River, 186 were seen on June 16. It was abundant on Dewey Lake from June 3 to 18; Willow Lake, June 4 to 14; Trout Lake, June 9 and 11; at Wendler Swamp, June 10 and 18; Pearson Lake, June 18; and Speckelmire Lake, June 16. It was common on Silver Lake, June 16; Rat Lake, Brown County, June 14; West Chain Lake, Brown County, June 14; Johnson Lake, June 8; West Twin Lake, eastern Cherry County, June 8; the Hague Lakes, eastern Morrill County, June 21; Bean Lake, June 21 and 22; and the Peterson Lakes, Garden County, June 22. It was rather generally distributed throughout the lakes of Garden, Morrill, and Brown Counties, but somewhat more irregularly in the other localities.

A single individual was noted on Red Deer Lake, eastern Cherry County, October 6; 2 on Moon Lake, Brown County, October 10; and 1 on Goose Lake, Garden County, October 14.

PIED-BILLED GREBE. *Podilymbus podiceps podiceps.*

Unlike the preceding species, this grebe did not frequent much the open water, but kept for the most part within the protection of the reeds and rushes bordering the lakes. At the eastern end of Dewey Lake on June 4, a nest in the rushes near the shore, from which a female was seen to depart, was found to contain 8 eggs. It finally came to grief in a heavy windstorm which a few days later swept the lake.

This bird of retiring habits is apparently not very common. I did not see it at all during June in Morrill County, nor in any of the lakes about the source of the North Loup River. Two were seen at Marsh Lake, Brown County, June 13; 1 on Welker Lake, June 11; 1 at Wendler Swamp, June 10; 4 on Johnson Lake, June 8; 1 on Red Deer Lake, June 8; 1 on West Twin Lake, eastern Cherry County, June 8; 3 on Long Lake, eastern Cherry County, June 5; 1 on Watts Lake, June 5; 2 on Hackberry Lake, June 5; 4 on Willow Lake, June 4; and 3 on South Cody Lake, June 1.

In autumn, in eastern Cherry County, it was seen as follows: one on Middle Lake, October 8; 12 on Clear Lake, October 9; 1 on Dewey Lake, October 12; and 1 on Whitewater Lake, October 12. In Brown County one was seen on Moon Lake, October 10; 1 on Filbrick Lake on the same date; and 2 on Enders Lake, October 11. In Garden County 2 were found on Goose Lake, October 14, and 1 on Roundup Lake on the same day.

*** LOON.** *Gavia immer.*

A single individual was observed on Pelican Lake, eastern Cherry County, October 12, 1915.

*** FRANKLIN GULL.** *Larus franklinii.*

This species was seen in summer on only three occasions: One at Duck Lake, eastern Cherry County, June 5; 4 on Enders Lake, Brown County, June 13; and 4 at Clear Lake, Brown County, June 14.

A single individual was seen at Shoveller Lake, eastern Cherry County, October 8; and 6 on Twin Lake, Brown County, October 11.

*** RING-BILLED GULL.** *Larus delawarensis.*

A flock of 11 was seen on the south shore of Dewey Lake on June 4, and a solitary individual was noticed flying along the lake on the previous day; 4 were noticed on Clear Lake, June 3, and 3 on the following day, but all these may have been derived from the flock seen on Dewey Lake. No others were noted in summer on any of the lakes.

On most of the lakes in eastern Cherry County this gull was common, October 6 to 9, 1915; and we saw one on Blue Lake, Garden County, October 14, and 7 on Crescent Lake on the same day.

FORSTER TERN. *Sterna forsteri.*

The loud, harsh cries and dazzling white plumage of the Forster tern make it a conspicuous object as it beats about over the lakes. It is fond of perching on fence posts or stakes in the water, but descends to the ground not so frequently as the black tern.

This tern is common in summer throughout the region visited, except about the lakes at the head of the North Loup River and the lakes of Garden and Morrill Counties. It is most numerous and generally distributed on the lakes of eastern Cherry County, and there most abundant on Pelican Lake, where the writer saw 40 on June 10. It was common at Dewey Lake from June 3 to 18. We saw 6 on Clear Lake, June 4; 8 on Hackberry Lake, June 5; 6 on Red Deer Lake, June 8; 5 on Trout Lake, June 11; 11 on Big Alkali Lake, June 9; and 4 on Molly Marsh, June 11. It was noted also at Watts Lake on June 5; Wendler Swamp on June 10; at the easternmost of the Sweetwater Lakes, June 12; on South Cody Lake, June 1; on Clear Lake, Brown County, June 14; Willow Lake, Brown County, June 14; and West Twin Lake, near the head of the North Loup River, June 16. It was abundant at Moon Lake, Brown County, where 24 were seen on June 13. The only lakes in Garden County at which this tern was noted were Jones Lake, where 4 were seen, and Beaver Lake, where 7 were observed, all on June 21.

* Five were seen on Dewey Lake, eastern Cherry County, on October 7, and 2 others on Pelican Lake, October 12, 1915.

*** COMMON TERN.** *Sterna hirundo.*

A single individual at Dewey Lake on June 5 was the only individual noted.

BLACK TERN. *Hydrochelidon nigra surinamensis.*

This is by far the most abundant summer water bird throughout all this region, except about the lakes of Garden and Morrill Counties, and outnumbers by more than two to one any of the other waterfowl. It is also one of the most generally distributed. It may be seen often in large companies—flocks they could hardly be called, for they are usually spread out all over the lakes on which they occur. The largest number of black terns seen at any one place was at Trout Lake, where 532 were counted on June 9 and 11. They were very abundant also on South Cody Lake, June 21; Dewey Lake, June 3 to 18; Pelican Lake, June 10; Dads Lake, June 7; Marsh Lake, June 8; Hay Lake, June 8 and 11; Wendler Swamp, June 10 and 18; Pearson Lake, June 18; Enders Lake, June 13 and 14; West Chain Lake, Brown County, June 14; Silver Lake, near the head of the North Loup River, June 16; and common on Moffitt Lake, Garden County, June 21; and on Bean Lake, June 21 and 22. The crackling cry and the hovering, butterflylike flight of this dainty little species are sure to attract attention. It may be seen often resting on the exposed sand bars or mud flats about the lakes or on heaps of vegetation among the rushes. It breeds in numbers on many of the lakes.

AMERICAN BITTERN. *Botaurus lentiginosus.*

This bird is rather common in summer about the lakes, though apparently not numerous in any locality. It was seen on Gordon Creek, near Simeon, June 3; at Watts Lake, June 5; Pelican Lake, June 10; Marsh Lake, June 8; Red Deer Lake, June 8; Foster Lake, June 9; L Lake, June 9; Whitewater Lake, June 10; Molly Marsh, June 11, all in eastern Cherry County; Diamond Lake, Brown County, June 14; Speckelmire Lake, at the head of the North Loup River, June 16; West Twin Lake, at the head of the North Loup River, June 16; Jones Lake, Garden County, June 21; Beaver Lake, June 21; Bean Lake, June 21; and Teal Lake, June 22.

In eastern Cherry County, one was noted on Dewey Lake, October 5, another on October 7, and three on October 12. One was seen on Marsh Lake, October 8; six on Pelican Lake, October 12; and one on Moon Lake, in Brown County, on October 10.

† LEAST BITTERN. *Ixobrychus exilis.*

This species occurs occasionally in summer in the marshes about the lakes in the sandhill region, but is apparently nowhere common.

GREAT BLUE HERON. *Ardea herodias herodias.*

Of rare occurrence in most of the sandhill country, but known to breed. We saw only two individuals in summer—one at Willow Lake, eastern Cherry County, June 4, 1915; the other at Thedford, on the Loup River, June 19.

Two were seen near Red Deer Lake, eastern Cherry County, on October 5, and one on Dewey Lake, October 12.

BLACK-CROWNED NIGHT HERON. *Nycticorax nycticorax naevius.*

This is a common summer bird over the greater part of the sandhill region, though of somewhat irregular distribution. It was seen at all the groups of lakes excepting the Cody Lakes, but was most numerous at Pelican Lake on June 10, when 105 were seen. It was also numerous at Moon Lake, Brown County, on June 13, and White Willow Lake, near the source of the North Loup River, on June 16. In small numbers it was observed on Dewey Lake, June 4; Willow Lake, June 4; Marsh Lake, June 8; Big Alkali Lake, June 9;

Smith Lake, June 10; Whitewater Lake, June 10; Molly Marsh, June 11, all in eastern Cherry County; Post (Clapper) Lake, Brown County, June 13; Red Willow Lake, June 16; Swan Lake, Garden County, June 21; Jones Lake, Garden County, June 21; and on several of the other lakes throughout the sandhills. It occurred in summer chiefly about the lakes, where it frequented usually the marshes about their borders. Occasionally it was in flocks of considerable size, as on Pelican Lake and on Moon Lake, as above noted.

In eastern Cherry County, 3 were seen between Wood Lake and Dewey Lake on October 5; 1 on Red Deer Lake, October 6; 10 on Dewey Lake, October 12, and others at different times on this lake; and 1 on Moon Lake, Brown County, October 10.

WILSON PHALAROPE. *Steganopus tricolor.*

The dainty appearance and ducklike habits of this little wader at once attract the attention of even the casual observer. In Garden County it goes by the name "straw." It frequents chiefly the meadows and marshes about the lakes, though it often alights out on the water itself, particularly near the shore. Occasionally it appears along the streams, especially those that have marshy borders.

This is by considerable the most numerous breeding shore bird in the sandhill country, though it is not quite so universally distributed as the killdeer. It was, however, found commonly or abundantly at all the groups of lakes visited, being most abundant at Phalarope Lake, Garden County, June 22; Pelican Lake, eastern Cherry County, June 10; Ballard Swamp, June 8; North and Middle Marsh, June 8; Foster Lake, June 9; Belsky Lake, June 12; and Trout Lake, June 9 and 11. It was common also at South Cody Lake, June 1; Dewey Lake, June 3 to 18; Long Lake, eastern Cherry County, June 5; Dads Lake, June 7; Muleshoe Lake, June 7; Big Lake, June 7; Red Deer Lake, June 8; Big Alkali Lake, June 9; Smith Lake, June 10; Sweetwater Lakes, June 12; Middle Lake, June 12; Duck Lake, near the head of the North Loup River, June 16; the Hague Lakes, Morrill County, June 21; Alkali Lake, Garden County, June 21; and at many of the other lakes of the region.

AMERICAN AVOCET. *Recurvirostra americana.*

The avocet, though formerly occurring over all the sandhill region, was not observed, except at the lakes of Garden and Morrill Counties. Here it was tolerably common in summer, though irregularly distributed. We noted it as follows: the Hague Lakes, June 21; Wild Goose Lake, June 21; Young Lake, June 21; Moffitt Lake, June 21; Swan Lake, June 21; Jones Lake, June 21; Alkali Lake, June 21; a small lake near Trainor Lake, June 22; a small lake near the Peterson Lakes, June 22; and Phalarope Lake, June 22.

One was seen at Reno Lake, Garden County, October 14, 1915.

*** WHITE-RUMPED SANDPIPER.** *Pisobia fuscicollis.*

One, on Gordon Creek a few miles north of Simeon, on June 3, was the only individual observed.

*** BAIRD SANDPIPER.** *Pisobia bairdii.*

Two were seen along the shore of Coleman Lake, eastern Cherry County, on June 10, but the species was not otherwise noted.

*** LEAST SANDPIPER.** *Pisobia minutilla minutilla.*

A single bird seen on the upper part of Gordon Creek a few miles north of Simeon, June 3, is the only record.

*** SEMIPALMATED SANDPIPER.** *Ereunetes pusillus.*

A flock of 20 was seen at Crystal Lake, in Brown County, on October 11, 1915.

† MARBLED GODWIT. *Limosa fedoa.*

This species is reported to have been found breeding here, but it is apparently very rare at this season.

† SOLITARY SANDPIPER. *Helodromas solitarius solitarius.*

Reported to be a breeding bird of the sandhill region, but seemingly very rare; we did not observe it at any of the localities visited.

SPOTTED SANDPIPER. *Actitis macularia.*

The well-known spotted sandpiper is apparently rare in this region, as we saw only four individuals, all on the upper part of Gordon Creek a few miles north of Simeon, June 3.

KILLDEER. *Oxyechus vociferus vociferus.*

This ubiquitous species is, of course, one of the most widely distributed summer shorebirds of the region. At this season it was found at or near a great majority of the lakes, and in some places was abundant. It was most numerous in eastern Cherry County, on Willow Lake, June 4 to 14; Dewey Lake, June 3 to 18; Pelican Lake, June 10; Trout Lake, June 11; Big Alkali Lake, June 9; Dads Lake, June 7; Hackberry Lake, June 5; Gordon Creek, June 3; Ballard Swamp, June 8; and North, Middle, and South Marsh, June 8. It was common also at South Cody Lake on June 9; Moon Lake, Brown County, June 13; Enders Lake, June 13 and 14; Rat and Diamond Lakes, Brown County, June 14; Speckelmire Lake, near the source of the North Loup River, June 16, and at Silver Lake in the same region on the same date; also at Reno Lake, Garden County, June 22; Eldred Lake, June 22; Bean Lake, June 21 and 22; the Peterson Lakes, June 22; and at the Hague Lakes, in Morrill County, June 21. Young were seen with their parents at Ballard Swamp on June 8 and on several occasions during June at other localities.

Our only autumn record is a single bird seen at Ballard Swamp, eastern Cherry County, October 7, 1915.

† PIPING PLOVER. *Charadrius melodus.*

This plover was formerly apparently not uncommon about the lakes of the sandhill region, and formerly bred about Trout Lake, eastern Cherry County. We, however, did not observe a single individual at any of the localities visited.

Part II.—WILD-DUCK FOODS OF THE SANDHILL REGION OF NEBRASKA.

By W. L. McAtee, *Assistant Biologist.*

INTRODUCTION.

The sandhill region of Nebraska is one of a myriad of ponds and lakes. Not only are bodies of water very plentiful and comparatively little visited by man, but also they are well supplied with the vegetation which furnishes the cover so necessary to breeding wild ducks as well as a large proportion of their food. It is not surprising, therefore, that this region is a paradise for wild fowl.

The wild-duck foods and other vegetation growing in and about 44 lakes of the sandhill region are the subject of the present report, which is based on notes and specimens collected during the period from July to October, 1915, by Mr. Ray Thomson, then a graduate student of the University of Nebraska. The specimens were identified by the writer, with the following assistance in difficult groups: Grasses, Prof. A. S. Hitchcock and Mrs. Agnes Chase; *Carex*, Mr. G. P. Van Eseltine; *Juncus*, Mr. Frederick V. Coville; and Compositæ, Mr. Paul C. Standley. Two species of aquatic mosses were kindly identified by Miss Mary Miller, and a willow by Mr. C. R. Ball.

Most of the lakes visited by Mr. Thomson are well supplied with plants valuable as food for wild ducks, and this is especially true of Dewey, Hackberry, Beaver, White Willow, Marsh, and Cody Lakes, and Ballard Swamp, Cherry County; and Gimlet Lake, Garden County. It is worthy of note that sago pondweed (*Potamogeton pectinatus*), probably the best all-around duck food, was found in every lake visited except Trout Lake, Cherry County, and there is little doubt that the plant grows in that lake also. Wild rice (*Zizania*), an excellent wild-duck food, was found in four of the Brown County lakes, in eight of those of eastern Cherry County, and in the Cody Lakes, but was not found in any of the lakes at the head of the Loup River nor in those of Garden County.

The most important wild-duck foods in addition to sago pondweed and wild rice that occur generally in the sandhill region are:

Musk grass (*Chara* spp.).
Small pondweed (*Potamogeton pusillus*).
Variable pondweed (*Potamogeton heterophyllus*).
Bushy pondweed (*Najas flexilis*).
Wapato (*Sagittaria latifolia*).
Wild millet (*Echinochloa crus-galli*).
Big bulrush (*Scirpus occidentalis*).
River bulrush (*Scirpus fluviatilis*).
Tule (*Scirpus validus*).
Big duckweed (*Spirodela polyrhiza*).
Small duckweed (*Lemna minor*).
Star duckweed (*Lemna trisulca*).
Coontail (*Ceratophyllum demersum*).

So far as food conditions are concerned, therefore, the lakes of the sandhill region of Nebraska are well fitted to be a wild-duck breeding-ground of the first rank.

IMPROVEMENT OF WILD-DUCK FOOD SUPPLY.

The most notable deficiency in the above list of plants is wild celery (*Vallisneria spiralis*). This is an excellent duck food and undoubtedly will grow in practically all the lakes of the sandhill region. It probably will grow anywhere that sago pondweed does. Chufa (*Cyperus esculentus*) also was not found among the plants collected, although it is especially suited to growth in sandy soil. It may be used to advantage as a duck food only where there are areas dry in summer, to permit growth of the plant, and flooded in winter, so that the ground may be softened sufficiently for ducks to dig the tubers.

However, as noted above, most of the lakes of the sandhill region are well provided with wild-duck foods. In few cases is need of improvement indicated, and the only agencies practically interested in improving the food supply of ducks are shooting clubs controlling certain bodies of water. To them it may be said that adding wild celery or chufas to bodies of water where conditions are suitable, or any of the plants in the preceding list where they do not now exist, will improve the feeding conditions for wild fowl. Directions for propagating most of these plants are contained in Bulletins of the United States Department of Agriculture, Nos. 205 and 465.[1] Further information relating to the plants and the names of dealers in them will be furnished by the Biological Survey upon request.

EFFECT OF ALKALINE CONDITIONS ON DUCK-FOOD PLANTS.

The most important information gained in the study of the duck-food plants of the sandhill region relates to the comparative tolerance of the different species to alkalinity of the water. According to Dr. R. J. Pool, "the waters of practically all of the many ponds and lakes contain considerable quantities of saline and alkaline compounds."[2] This being the case, and in view of the luxuriant growth of aquatic plants in most of the lakes, it is evident that the degree or quality of alkalinity of most of them is not injurious.

The lakes examined during the present investigation that are popularly recognized as alkaline are Rat and Willow Lakes in Brown County; Big Alkali, Clear, and Silver Lakes in Cherry County, and, to a lesser degree, Red Willow, White Willow, and Speckelmire Lakes of the same county; and Moffitt, Crescent, Beaver (or Blue), Phalarope, and Peterson Lakes in Garden County.

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[1] Eleven important wild-duck foods, Bull. 205, U. S. Dept. Agr., pp. 25, figs. 23, May 20, 1915; Propagation of wild-duck foods, Bull. 465, pp. 40, figs. 35, Feb. 23, 1917.

[2] A study of the vegetation of the sandhills of Nebraska. Minn. Botanical Studies, vol. 4, Part III, p. 275, 1914.

Those in which unfavorable conditions are reflected in the character of the vegetation are Big Alkali and Silver, and to a lesser extent Clear Lake, and all the Garden County lakes; the others have the usual abundant aquatic growth. In addition to these the collector notes that Twenty-one Lake, Cherry County, is perhaps a little alkaline; however, this is not evident in the vegetation. From the character of the plant growth one would judge that Jones and Swan Lakes, also of Garden County, are alkaline.

The lesser injurious effects of alkalinity upon submerged vegetation are largely reduction of the quantity of such growth and unthriftiness of the species not adapted to withstand alkaline condition. The effect of still further concentration of alkalis in the water is elimination of most of the species of submerged aquatic plants, and the almost exclusive occupation of the water by certain resistant species. Concentration beyond this point undoubtedly would have a disastrous effect upon even these hardy species, but this condition was not observed in any of the 44 lakes examined.

Probably the most severe alkaline conditions of any of these lakes are represented by Peterson Lake No. 2, Garden County. In this lake widgeon grass (*Ruppia occidentalis*),[1] a plant that grows in brackish water, is the dominant submerged species, practically filling the lake. Sago pondweed is the only other subaqueous growth. In the other lakes in which aquatic plants are greatly affected by alkalinity, sago pondweed in every case is the dominant and often the only submerged growth. It is fortunate that such plants as these endure the most alkaline waters of the sandhills, because both are very important wild-duck foods, especially the sago. This pondweed also thrives in brackish water, which fact, together with the occurrence of the widgeon grass, suggests that the same qualities that adapt plants for growth in salt water enable them to resist the injurious effects of alkalis. This idea is further borne out by the character of the semisubmerged plants associated with the two species above named in their alkaline habitat. These include saltgrass (*Distichlis spicata*) and three-square (*Scirpus americanus*), both of which grow in coastal salt marshes. Another salt-marsh plant, namely, arrow-grass (*Triglochin maritima*), while occurring at several places in the sandhills, seems to have no special relation to alkaline conditions.

The species ranking next in their endurance of alkalinity, though by no means to be compared with the above, are curly pondweed (*Potamogeton perfoliatus richardsonii*), small pondweed (*Potamogeton pusillus*), and spike rush (*Eleocharis*, probably *glaucescens*). Wild rice can not endure salt, nor, presumably therefore, alkalis.

[1] This species was collected in Reno Lake also.

This probably explains its absence from Loup River and the Garden County lakes.

In attempting to stock alkaline waters with wild-duck foods, therefore, it will be best to center efforts upon establishing widgeon grass or sago pondweed. Wild celery withstands salt as well as these two plants and probably would equal them in alkali resistance, though this has not been tried out. A purely theoretical suggestion is that eelgrass (*Zostera marina*), an inhabitant of ocean-water, might be found adapted to stronger alkaline waters than any of these three plants.

LIST OF PLANTS OF THE SANDHILL LAKES.

The descriptions of lakes given in the following pages, the classification of the plants according to their place of growth, and notes on abundance are taken in the main from the reports of Mr. Ray Thomson. He is responsible, therefore, for the bulk of the occurrence records. These are based on a system of "collector numbers" which he used in making his reports, and were translated into plant names after the specimens were identified in Washington. Where specimens from any locality were actually examined an asterisk (*) follows the name of the species. Remarks other than those on abundance, and a few other obvious field observations, are based on specimens.

Each list is followed by a paragraph commenting on the value of its components as food for wild ducks.

LIST OF LAKES VISITED, WITH DATES, 1915.

Brown County.

Enders Lake——Aug. 10, 14 (p. 41).
Enders Lake Overflow—Aug. 11 (p. 42).
Marsh Lake——Aug. 12, 13 (p. 43).
Rat Lake——Aug. 14 (p. 44).
Willow Lake——Aug. 15 (?) (p. 44).
West Chain Lake——Aug. 16 (p. 45).
Middle Chain Lake——Aug. 16 (p. 46).

Cherry County (Eastern Part).

Dewey Lake——Aug. 21–24 (p. 46).
Willow Lake——Aug. 23, 24 (p. 48).
Clear Lake——Aug. 25 (p. 49).
Hackberry Lake——Aug. 27 (p. 50).
Watts Lake——Aug. 29 (p. 51).
Trout Lake——Aug. 31 (p. 52).
Pelican Lake——Sept. 1 (p. 53).
Rat Lake——Sept. 3, 4 (p. 54).
Beaver Lake——Sept. 3, 4 (p. 55).
Wendler Swamp——Sept. 4, 10 (p. 55).
Sweetwater Lakes——Sept. 6 (p. 56).
Twenty-one Lake——Sept. 6 (p. 57).
Marsh Lakes——Sept. 7 (p. 58).
Red Deer Lake——Sept. 10 (p. 59).
Ballard Swamp——Sept. 10 (p. 59).
Big Alkali Lake——Sept. 13 (p. 60).
Molly Marsh——Sept. 13 (p. 61).
Hay Lake——Sept. 14 (p. 62).

Cherry County (Northern Part).

South Cody Lake—Sept. 18–19 (p. 62).
North Cody Lake——Sept. 20 (p. 64).

CHERRY COUNTY (HEADWATERS LOUP RIVER).

Red Willow Lake_____Oct. 9 (p. 65).
White Willow Lake____Oct. 10 (p. 66).
Specklemire Lake_____Oct. 12 (p. 67).
Yearling Valley Lake__Oct. 13 (p. 67).
Silver Lake_____Oct. 17 (p. 68).

GARDEN COUNTY.

Moffitt Lake_____Sept. 23 (p. 69).
Gimlet Lake_____Sept. 24 (p. 70).
Crescent Lake_____Sept. 26 (p. 71).
Beaver (or Blue) Lake____Sept. 27–28 (p. 71).
Jones Lake_____Sept. 27–28 (p. 72).
Swan Lake_____Sept. 27–28 (p. 73).
Reno Lake_____Sept. 29 (p. 74).
Trainor Lakes_____Sept. 30 (p. 75).
Peterson Lake, No. 1____Oct. 2 (p. 75).
Peterson Lake, No. 2____Oct. 2 (p. 76).
Phalarope Lake_____Oct. 3 (p. 77).

ENDERS LAKE, BROWN COUNTY.

August 10 and 14, 1915.

Description.—Little or no marsh. Rich growth of submerged vegetation. Fresh water, average greatest depth 6 feet; bottom in general mucky, sandy at southeast end. No inlet; outlet into Enders Lake Overflow.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Narrow zone of wet meadow on east and south shores containing a typical mixture of wet meadow plants. Among those growing next to water line were:

1. Cord-grass (*Spartina michauxiana*). Common.
2. Switchgrass (*Panicum virgatum*). Common.
3. Hair-grass (*Agrostis hyemalis*).
4. Redtop (*Agrostis alba*).
5. Bog reedgrass (*Calamagrostis inexpansa*). Common.
6. Reed canary-grass (*Phalaris arundinacea*).
7. Wild rye (*Elymus canadensis*).* Flowers.
8. Sedge (*Carex vulpinoidea*).
9. Shining sedge (*Cyperus rivularis*).* Common.
10. Water hemlock (*Cicuta maculata*). Not abundant.
11. Marsh mint (*Stachys palustris*).
12. Mint (*Mentha canadensis*).* Flowers.
13. Ragweed (*Ambrosia elatior*).* Abundant; flowers.

SEMISUBMERGED PLANTS.

14. Wapato, or arrowhead (*Sagittaria latifolia*).* Common; flowers.
15. Crested wapato (*Sagittaria cristata*).* Flowers to immature fruit.
16. Big bulrush (*Scirpus occidentalis*).* Abundant; flowers.
17. Spike rush (*Eleocharis acicularis*).*

SUBMERGED PLANTS.

Dominants:

19. Waterweed (*Philotria canadensis*).* Flowers.
20. Water milfoil (*Myriophyllum spicatum*).* Immature fruit.

Principal species:

21. Sago pondweed (*Potamogeton pectinatus*).* Flowers to mature fruit.
22. Curly pondweed (*Potamogeton perfoliatus richardsonii*).* Flowers to mature fruit.

Secondary species:

23. Eelgrass pondweed (*Potamogeton compressus*).* Immature fruit.
24. Small pondweed (*Potamogeton pusillus*).* Mature fruit.
25. Floating pondweed (*Potamogeton natans*).* Mature fruit.

FLOATING PLANTS.

26. Star duckweed (*Lemna trisulca*).
27. Big duckweed (*Spirodela polyrhiza*).

Wild-duck foods.—Plants in the above list which have considerable value as food for ducks are Nos. 14, 16, 21, 24, 26, and 27; those of lesser importance are: Nos. 1, 2, 6, 8, 9, 17, 19, 20, 22, 23, and 25; the remainder are of no known value.

ENDERS LAKE OVERFLOW, BROWN COUNTY.

August 11, 1915.

Description.—Very little marsh. Semisubmerged vegetation abundant. Water fresh; small amount open; depth 6 to 7 feet. No outlet; inlet from Enders Lake.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Wide zone of wet meadow.

1. Cord-grass (*Spartina michauxiana*). Common.
2. Switchgrass (*Panicum virgatum*). Common.
3. Hair-grass (*Agrostis hyemalis*).
4. Redtop (*Agrostis alba*).
5. Bog reedgrass (*Calamagrostis inexpansa*).*
6. Shining sedge (*Cyperus rivularis*). Common.
7. Straw sedge (*Cyperus strigosus*). Abundant.
8. Sedge (*Carex vulpinoidea*).
9. Rush (*Juncus nodosus*). Abundant.
10. Rush (*Juncus canadensis*). Common.
11. Water hemlock (*Cicuta maculata*).
12. Marsh mint (*Stachys palustris*).

SEMISUBMERGED PLANTS.

Dominants:

13. Spike rush (*Eleocharis acuminata*).* Flowers.
14. Water smartweed (*Polygonum amphibium*).* Flowers.

Secondary species:

15. Bur reed (*Sparganium eurycarpum*).* Immature fruit.
16. Wapato (*Sagittaria latifolia*).
17. Reed (*Phragmites communis*).*
18. Big bulrush (*Scirpus occidentalis*).

SUBMERGED PLANTS.

Dominants:

19. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
20. Floating pondweed (*Potamogeton natans*).

Secondary species:

21. Water moss (*Drepanocladus aduncus aquaticus*).
22. Sago pondweed (*Potamogeton pectinatus*).
23. Eelgrass pondweed (*Potamogeton compressus*).
24. Small pondweed (*Potamogeton pusillus*).
25. Variable pondweed (*Potamogeton heterophyllus*).*
26. Water milfoil (*Myriophyllum spicatum*).

FLOATING PLANTS.

27. Star duckweed (*Lemna trisulca*).
28. Big duckweed (*Spirodela polyrhiza*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 16, 18, 22, 24, 25, 27, and 28; those of lesser importance are: Nos. 1, 2, 6, 7, 8, 14, 15, 19, 20, 23, and 26; the remainder are of no known value.

MARSH LAKE, BROWN COUNTY.

August 12–13, 1915.

Description.—Fresh-water lake, well filled with vegetation. Little open water, average greatest depth 6 to 7 feet, bottom mucky except at east end. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

A mixture in which no species are dominant is found in a narrow zone of wet meadow (2 to 5 rods) except on east side.

1. Cord-grass (*Spartina michauxiana*).* Flowers.
2. Switchgrass (*Panicum virgatum*).*
3. Hair-grass (*Agrostis hyemalis*).*
4. Redtop (*Agrostis alba*).*
5. Bog reedgrass (*Calamagrostis inexpansa*).*
6. Couch-grass (*Agropyron repens*).
7. Reed canary-grass (*Phalaris arundinacea*).*
8. Straw sedge (*Cyperus strigosus*).* Mature fruit.
9. Shining sedge (*Cyperus rivularis*).* Immature fruit.
10. Three-way sedge (*Dulichium arundinaceum*).* Flowers.
11. Sedge (*Carex vulpinoidea*).* Mature fruit.
12. Sedge (*Carex scoparia*).* Mature fruit.
13. Rush (*Juncus nodosus*).*
14. Rush (*Juncus canadensis*).* Abundant; flowers to immature fruit.
15. Rush (*Juncus marginatus*).* Mature fruit.
16. Rush (*Juncus dudleyi*).* Capsules empty.
17. Water hemlock (*Cicuta maculata*).* Flowers.
18. Marsh mint (*Stachys palustris*).* Flowers.
19. Water marigold (*Bidens beckii*).*

SEMISUBMERGED PLANTS.

Dominants:

20. Big bulrush (*Scirpus occidentalis*).
21. Spikerush (*Eleocharis acuminata*).
22. Water smartweed (*Polygonum amphibium*).

Secondary species:

23. Western water plantain (*Alisma brevipes*).* Flowers to immature fruit.
24. Wapato (*Sagittaria latifolia*).
25. Crested wapato (*Sagittaria cristata*).
26. Reed (*Phragmites communis*).
27. Rush (*Juncus balticus*).* Flowers.

SUBMERGED PLANTS.

Dominants:

28. Curly pondweed (*Potamogeton perfoliatus richardsonii*).

Secondary species:

29. Sago pondweed (*Potamogeton pectinatus*).*
30. Eelgrass pondweed (*Potamogeton compressus*).
31. Small pondweed (*Potamogeton pusillus*).* Flowers.
32. Floating pondweed (*Potamogeton natans*).
33. White water crowfoot (*Batrachium circinatum*).*
34. Bladderwort (*Utricularia vulgaris*).*
35. Water milfoil (*Myriophyllum spicatum*).

FLOATING PLANT.

36. Star duckweed (*Lemna trisulca*).*

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 20, 24, 29, 31, and 36; those of lesser importance are: Nos. 1, 2, 8, 9, 11, 12, 19, 21, 22, 28, 30, 32, 33, and 34; the remainder are of no known value.

RAT LAKE, BROWN COUNTY.

August 14, 1915.

Description.—No marsh, and grazed to water's edge around entire lake. Largely open water; average greatest depth 3 to 4 feet; bottom sandy. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Not conspicuous.

1. Wild millet (*Echinochloa crus-galli*).* Mature fruit.
2. Sedge (*Carex nebraskensis*).* Mature fruit.
3. Rush (*Juncus nodosus*).*
4. Richweed (*Pilea pumila*).*
5. Yellow monkey-flower (*Mimulus geyeri*).*
6. Mint (*Mentha canadensis*).

SEMISUBMERGED PLANTS.

Dominants:

7. Wild rice (*Zizania palustris*).* Flowers.
8. Big bulrush (*Scirpus occidentalis*).

Secondary species:

9. Cat-tail (*Typha latifolia*).
10. Western water plantain (*Alisma brevipes*).* Not common.
11. Geyer water plantain (*Alisma geyeri*).* Immature fruit.
12. Wapato (*Sagittaria latifolia*).* Immature fruit.
13. Crested wapato (*Sagittaria cristata*).

SUBMERGED PLANTS.

Dominants:

14. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
15. Water milfoil (*Myriophyllum spicatum*).*

Secondary species:

16. Musk grass (*Chara* sp.)*
17. Sago pondweed (*Potamogeton pectinatus*).
18. Long-leaved pondweed (*Potamogeton americanus*).* Flower buds.
19. Bushy pondweed (*Najas flexilis*).* Immature fruit.
20. Coontail (*Ceratophyllum demersum*). Abundant.

FLOATING PLANTS.

21. Star duckweed (*Lemna trisulca*).*
22. Big duckweed (*Spirodela polyrhiza*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 1, 7, 8, 12, 16, 17, 19, 20, 21, and 22; those of lesser importance are: Nos. 2, 10, 11, 13, 14, 15, and 18; the remainder are of no known value.

WILLOW LAKE, BROWN COUNTY.

August 15 (?), 1915.

Description.—No marsh area. Water clouded, owing to abundance of a single-celled alga; mostly open water; average greatest depth 6 feet; bottom, as a whole, sandy. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Include principally:

1. Cord-grass (*Spartina michauxiana*).
2. Wild millet (*Echinochloa crus-galli*).
3. Switchgrass (*Panicum virgatum*).
4. Redtop (*Agrostis alba*).

SEMISUBMERGED PLANTS.

Dominants:
5. Wapato (*Sagittaria latifolia*).
6. Spike rush (*Eleocharis acuminata*).

Secondary species:
7. Reed (*Phragmites communis*).
8. Wild rice (*Zizania palustris*). Rare.
9. Big bulrush (*Scirpus occidentalis*).

SUBMERGED PLANTS.

Dominants:
10. Sago pondweed (*Potamogeton pectinatus*).
11. Water milfoil (*Myriophyllum spicatum*).

Secondary species:
12. Eelgrass pondweed (*Potamogeton compressus*).
13. Floating pondweed (*Potamogeton natans*).
14. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
15. Small pondweed (*Potamogeton pusillus*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 2, 5, 8, 9, 10, and 15; those of lesser importance are: Nos. 1, 3, 11, 12, 13, and 14; the remainder are of no known value.

WEST CHAIN LAKE, BROWN COUNTY.

August 16, 1915.

Description.—Little or no marsh area. Well filled with vegetation. Bottom mucky; depth 4 feet. No inlet; outlet during high water into Middle Chain Lake.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

About as for neighboring lakes.

1. Switchgrass (*Panicum virgatum*).
2. Wild rye (*Elymus canadensis*).
3. Indian grass (*Sorgastrum nutans*).* Flowers.
4. Redtop (*Agrostis alba*).

SEMISUBMERGED PLANTS.

Dominants:
5. Cat-tail (*Typha latifolia*).* Mature fruit.
6. Crested wapato (*Sagittaria cristata*).
7. Big bulrush (*Scirpus occidentalis*).

Secondary species:
8. Wild rice (*Zizania palustris*). Very scattered stand on east end.
9. Spike rush (*Eleocharis acuminata*).
10. Water smartweed (*Polygonum amphibium*).* Flowers.

SUBMERGED PLANTS.

Dominants:
11. Waterweed (*Philotria canadensis*).
12. Water milfoil (*Myriophyllum spicatum*).

Secondary species:
13. Sago pondweed (*Potamogeton pectinatus*).* Mature fruit.
14. Variable pondweed (*Potamogeton heterophyllus*).* Flowers.
15. Floating pondweed (*Potamogeton natans*).
16. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
17. Long-leaved pondweed (*Potamogeton americanus*).*
18. Bushy pondweed (*Najas flexilis*).
19. Coontail (*Ceratophyllum demersum*).*

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 7, 8, 13, 14, 18, and 19; those of less importance are: Nos. 1, 6, 10, 11, 12, 15, 16, and 17; the remainder are of no known value.

MIDDLE CHAIN LAKE, BROWN COUNTY.

August 16, 1915.

Description.—Marsh at east end. Bog at west end, which is inaccessible. Lake entirely filled with vegetation. Bottom mucky; greatest depth, 4 feet; inlet from West Chain Lake during high water; outlet into East Chain Lake.

Distribution of Vegetation.

SHORE PLANTS.

1. Cord-grass (*Spartina michauxiana*).
2. Switchgrass (*Panicum virgatum*).
3. Redtop (*Agrostis alba*).
4. Couch-grass (*Agropyron repens*).
5. Wild millet (*Echinochloa crus-galli*). Common.
6. Wild rye (*Elymus canadensis*). Common.
7. Indian grass (*Sorghastrum nutans*).
8. Shining sedge (*Cyperus rivularis*).
9. Straw sedge (*Cyperus strigosus*).
10. Sedge (*Carex scoparia*).
11. Sedge (*Carex nebraskensis*).
12. Rush (*Juncus nodosus*).
13. Rush (*Juncus marginatus*).
14. Rush (*Juncus dudleyi*).
15. Water hemlock (*Cicuta maculata*).

SEMISUBMERGED PLANTS.

Dominants:

16. Wapato (*Sagittaria latifolia*).
17. Big bulrush (*Scirpus occidentalis*).

Secondary species:

18. Bur reed (*Sparganium eurycarpum*).
19. Cat-tail (*Typha latifolia*).
20. Spike rush (*Eleocharis acuminata*).
21. River bulrush (*Scirpus fluviatilis*). Abundant; mature fruit.
22. Reed (*Phragmites communis*).
23. Wild rice (*Zizania palustris*). Very little.
24. Water smartweed (*Polygonum amphibium*).

SUBMERGED PLANTS.

Dominants:

25. Waterweed (*Philotria canadensis*).
26. Coontail (*Ceratophyllum demersum*).

Secondary species:

27. Sago pondweed (*Potamogeton pectinatus*).
28. Eelgrass pondweed (*Potamogeton compressus*).
29. Floating pondweed (*Potamogeton natans*).
30. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
31. Small pondweed (*Potamogeton pusillus*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 5, 16, 17, 23, 26, 27, and 31; those of less importance are: Nos. 1, 2, 8, 9, 10, 11, 18, 21, 24, 25, 28, 29, and 30; the remainder are of no known value.

Notes on Other Brown County Lakes.

There are about 20 acres of wild rice (*Zizania palustris*) at the west end of Long Lake, and about 20 to 30 acres at Frank Wales Swamp, between Long Lake and Clopper Lake. Filbrick Lake is said to contain a considerable area of rice.

DEWEY LAKE, CHERRY COUNTY.

August 21–24, 1915.

Description.—Extensive marsh area at west end of the lake. Mostly open water; depth 9 to 10 feet; bottom mostly sandy except at west end and extreme east end, which is muck. Outlet into Willow Lake; inlet from White Water Lake; this inflow from White Water Lake during high water has probably rendered Dewey Lake somewhat alkaline.

Distribution of Vegetation.

SHORE PLANTS.

1. Cord-grass (*Spartina michauxiana*).* Common; flowers.
2. Switchgrass (*Panicum virgatum*).* Abundant.
3. Bog reedgrass (*Calamagrostis inexpansa*).* Common.
4. Satin grass (*Muhlenbergia foliosa*).* Common; flowers.
5. Straw sedge (*Cyperus strigosus*).* Common.
6. Spike rush (*Eleocharis acicularis*).* Common on wet shore and shallow water; flowers.
7. Sedge (*Carex scoparia*).* Rare; flowers.
8. Rush (*Juncus balticus*).*
9. Rush (*Juncus torreyi*).* Common; flowers.
10. Rush (*Juncus marginatus*).* Abundant; mature fruit.
11. Rush (*Juncus dudleyi*).* Common; mature fruit.
12. Richweed (*Pilea pumila*).* Common; immature fruit.
13. Heart's-ease (*Polygonum pennsylvanicum*).*
14. Water-hemp (*Acnida tuberculata*).* Common; flowers.
15. Dragon-head (*Dracocephalum virginianum*).* Common.
16. Mint (*Mentha canadensis*).* Common; flower buds.
17. Marsh mint (*Stachys palustris*).* Common.
18. Willow herb (*Epilobium lineare*).* Sparse; flowers to mature fruit.
19. Small cleavers (*Galium trifidum*).* Sparse in marsh and wet shore; flowers to immature fruit.
20. Blue lobelia (*Lobelia syphilitica*).* Common; flowers.
21. Sticktight (*Bidens trichosperma*).* Sparse; flowers.

MARSH, OR BOG, PLANTS.

22. Marsh fern (*Dryopteris thelypteris*).* Common.
23. Bur reed (*Sparganium eurycarpum*). Sparse.
24. Wapato (*Sagittaria latifolia*). Abundant.
25. Reed (*Phragmites communis*). Abundant.
26. Spike rush (*Eleocharis acuminata*).
27. Spike rush (*Eleocharis acicularis*).* Common; flowers.
28. Big bulrush (*Scirpus occidentalis*). Abundant.
29. Sedge (*Carex utriculata*).* Common; mature fruit.
30. Tall dock (*Rumex altissimus*).* Sparse; immature fruit.
31. Water hemlock (*Cicuta maculata*).* Sparse; flowers.

SEMISUBMERGED PLANTS.

Dominants:

32. Reed (*Phragmites communis*).* Flowers.
33. Big bulrush (*Scirpus occidentalis*).* Flowers.

Secondary species:

34. Bur reed (*Sparganium eurycarpum*).* Sparse; immature fruit.
35. Cat-tail (*Typha latifolia*).
36. Wapato (*Sagittaria latifolia*).* Abundant; flowers to immature fruit.
37. Arrow-grass (*Triglochin maritima*).* Common; flowers.
38. Wild rice (*Zizania palustris*). Sparse at west end of lake and in poor condition.
39. Spike rush (*Eleocharis acuminata*).* Flowers.
40. Water smartweed (*Polygonum amphibium*).* Common; mature fruit.

SUBMERGED PLANTS.

Dominants:

41. Water moss (*Drepcnocladus aduncus aquaticus*).
42. Coontail (*Ceratophyllum demersum*).*

Secondary species:

43. Eelgrass pondweed (*Potamogeton compressus*).* Common.
44. Sago pondweed (*Potamogeton pectinatus*).* Common.
45. Curly pondweed (*Potamogeton perfoliatus richardsonii*). Common.
46. Illinois pondweed (*Potamogeton illinoensis*). Sparse.
47. Bushy pondweed (*Najas flexilis*).* Common.
48. Small pondweed (*Potamogeton pusillus*).* Common.
49. Water smartweed (*Polygonum amphibium*). Sparse.
50. Spatterdock (*Nymphaea advena*).* Common; flowers to mature fruit.
51. Water milfoil (*Myriophyllum spicatum*).* Common.
52. Bladderwort (*Utricularia vulgaris*).* Common.

FLOATING PLANTS.

53. Star duckweed (*Lemna trisulca*).* Common.
54. Small duckweed (*Lemna minor*).* Common.
55. Big duckweed (*Spirodela polyrhiza*).* Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 24 (36), 28 (33), 38, 42, 44, 47, 48, 53, 54, and 55; those of less importance are: Nos. 1, 2, 5, 6, 7, 13, 21, 23, 26 (39), 29, 34, 40 (49), 43, 45, 46, 50, and 51; the remainder are of no known value.

WILLOW LAKE, CHERRY COUNTY.

August 23–24, 1915.

Description.—Little or no marsh; grazed to water's margin on north, east, and south shores. Well filled with vegetation. Open water extensive, average greatest depth 9 feet. Inlet from Dewey Lake; outlet into Trout Lake.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Grasses, sedges, etc., as for Dewey Lake.

MARSH PLANTS.

Small amount at west side.

1. Cord-grass (*Spartina michauxiana*).
2. Straw sedge (*Cyperus strigosus*). Abundant.
3. Spike rush (*Eleocharis acuminata*).
4. Spike rush (*Eleocharis acicularis*). Common.
5. Big bulrush (*Scirpus occidentalis*).
6. Rush (*Juncus balticus*). Common.
7. Rush (*Juncus torreyi*). Common.
8. Dragon-head (*Dracocephalum virginianum*).
9. Marsh mint (*Stachys palustris*).

SEMISUBMERGED PLANTS.

Dominant:

10. Big bulrush (*Scirpus occidentalis*).* Common.

Secondary species:

11. Wapato (*Sagittaria latifolia*).
12. Spike rush (*Eleocharis acuminata*). Common.
13. Water smartweed (*Polygonum amphibium*). Common.

SUBMERGED PLANTS.

Dominant:

14. Water milfoil (*Myriophyllum spicatum*).*

Secondary species:

15. Sago pondweed (*Potamogeton pectinatus*). Common.
16. Eelgrass pondweed (*Potamogeton compressus*).* Common; nearly mature fruit; winter buds.
17. Small pondweed (*Potamogeton pusillus*).* Common; immature fruit.
18. Bushy pondweed (*Najas flexilis*). Common.
19. Water smartweed (*Polygonum amphibium*). Sparse.
20. White water crowfoot (*Batrachium divaricatum*).* Common; flowers.
21. Coontail (*Ceratophyllum demersum*). Common.

FLOATING PLANT.

22. Star duckweed (*Lemna trisulca*).* Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 5 (10), 11, 15, 17, 18, 21, and 22; those of less importance are: Nos. 1, 2, 3 (12), 4, 13 (19), 14, and 16; the remainder are of no known value.

CLEAR LAKE, CHERRY COUNTY.

August 25, 1915.

Description.—Some marsh at east end; narrow zone of wet meadow along south shore. Largely open water; average greatest depth, 7 to 8 feet; bottom at east and west ends mucky, while the other portion is sandy. No inlet; overflow into Willow Lake, during high water.

Distribution of Vegetation.

SHORE PLANTS.

1. Bur reed (*Sparganium eurycarpum*). Sparse.
2. Arrow-grass (*Triglochin maritima*). Common on wet shore.
3. Cord-grass (*Spartina michauxiana*). Sparse.
4. Switchgrass (*Panicum virgatum*). Common.
5. Hairy crabgrass (*Panicum huachucae*).* Common; immature and mature fruit.
6. Saltgrass (*Distichlis spicata*).* Abundant; mature fruit.
7. Squirrel-tail (*Hordeum jubatum*).* Abundant.
8. Broom-grass (*Andropogon furcatus*).* Common.
9. Dropseed (*Sporobolus asperifolius*).* Sparse.
10. Bog reedgrass (*Calamagrostis inexpansa*). Common.
11. Straw sedge (*Cyperus strigosus*). Common.
12. Spike rush (*Eleocharis acicularis*). Common on wet shore.
13. Sedge (*Carex scoparia*).
14. Rush (*Juncus balticus*).* Common on wet shore.
15. Rush (*Juncus dudleyi*). Common.
16. Rush (*Juncus marginatus*).
17. Bushy knotweed (*Polygonum ramosissimum*).* Common.
18. Heart's-ease (*Polygonum pennsylvanicum*).
19. Richweed (*Pilea pumila*).
20. Dragon-head (*Dracocephalum virginianum*).
21. Marsh mint (*Stachys palustris*).
22. Mint (*Mentha canadensis*).

MARSH PLANTS.

Consisting largely of:

23. Big bulrush (*Scirpus occidentalis*).*

Others are:

24. Squirrel-tail (*Hordeum jubatum*).
25. Saltgrass (*Distichlis spicata*).
26. Bushy knotweed (*Polygonum ramosissimum*).*

SEMISUBMERGED PLANTS.

Dominants:

27. Spike rush (*Eleocharis acuminata*).
28. Big bulrush (*Scirpus occidentalis*).

Secondary species:

29. Wapato (*Sagittaria latifolia*). Sparse.
30. Reed (*Phragmites communis*). Sparse.

SUBMERGED PLANTS.

Submerged vegetation is scattered and not abundant.

Dominant:

31. Sago pondweed (*Potamogeton pectinatus*).

Secondary species:

32. Eelgrass pondweed (*Potamogeton compressus*). Common.
33. Small pondweed (*Potamogeton pusillus*). Common.
34. Illinois pondweed (*Potamogeton illinoensis*). Not abundant.
35. Bushy pondweed (*Najas flexilis*). Sparse.
36. Coontail (*Ceratophyllum demersum*). Sparse.
37. Water milfoil (*Myriophyllum spicatum*. Sparse.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 23 (28), 29, 31, 33, 35, and 36; those of less importance are: Nos. 1, 2, 3, 4, 6 (25), 11, 12, 13, 18, 27, 32, 34, and 37; the remainder are of no known value.

HACKBERRY LAKE, CHERRY COUNTY.

August 27, 1915.

Description.—Lake well filled with submerged vegetation. Open water extensive; average greatest depth, 5 to 6 feet; bottom mostly mucky. No inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

1. Cord-grass (*Spartina michauxiana*). Sparse.
2. Switchgrass (*Panicum virgatum*). Abundant.
3. Bog reedgrass (*Calamagrostis inexpansa*). Common.
4. Satin grass (*Muhlenbergia foliosa*). Common.
5. Straw sedge (*Cyperus strigosus*). Abundant.
6. Spike rush (*Eleocharis acicularis*). Common on wet shore and shallow water.
7. Sedge (*Carex scoparia*).
8. Rush (*Juncus torreyi*). Common.
9. Rush (*Juncus marginatus*).
10. Richweed (*Pilea pumila*). Common.
11. Heart's-ease (*Polygonum pennsylvanicum*). Common.
12. Bushy knotweed (*Polygonum ramosissimum*).*
13. Water-hemp (*Acnida tuberculata*). Sparse.
14. Dragon-head (*Dracocephalum virginianum*). Common.
15. Marsh mint (*Stachys palustris*).
16. Blue lobelia (*Lobelia syphilitica*). Sparse.
17. Burweed (*Iva xanthifolia*).* Common; flowers.
18. Sunflower (*Helianthus annuus*).* Sparse.

MARSH PLANTS.

19. Marsh fern (*Dryopteris thelypteris*). Common.
20. Bur reed (*Sparganium eurycarpum*). Sparse.
21. Wapato (*Sagittaria latifolia*). Abundant.
22. Reed (*Phragmites communis*). Abundant.
23. Rice cut-grass (*Homalocenchrus oryzoides*).* Common.
24. Big bulrush (*Scirpus occidentalis*). Abundant.
25. Spike rush (*Eleocharis acicularis*). Common.
26. Spike rush (*Eleocharis acuminata*).
27. Sedge (*Carex utriculata*). Common.
28. Tall dock (*Rumex altissimus*). Sparse.
29. Watercress (*Sisymbrium nasturtium-aquaticum*).* Sparse.
30. Touch-me-not (*Impatiens biflora*).* Sparse.
31. Water hemlock (*Cicuta maculata*). Sparse.

SEMISUBMERGED PLANTS.

Dominants:

32. Wild rice (*Zizania palustris*).* A field of wild rice on north side about 1¼ miles long and from a few to several rods wide. Some reed (*Phragmites*) mixed with it.
33. Big bulrush (*Scirpus occidentalis*).*

Secondary species:

34. Wapato (*Sagittaria latifolia*). Common.
35. Reed (*Phragmites communis*). Common.
36. Spike rush (*Eleocharis acuminata*). Common.
37. Bristly sedge (*Carex comosa*).* Sparse; mature fruit.
38. Water hemlock (*Cicuta maculata*).

SUBMERGED PLANTS.

Dominant:

39. Coontail (*Ceratophyllum demersum*).

Secondary species:

40. Water moss (*Drepanocladus* sp.). Common.
41. Small pondweed (*Potamogeton pusillus*). Common.
42. Eelgrass pondweed (*Potamogeton compressus*). Common.
43. Sago pondweed (*Potamogeton pectinatus*). Abundant.
44. Curly pondweed (*Potamogeton perfoliatus richardsonii*).* Common.
45. Illinois pondweed (*Potamogeton illinoensis*).* Common.
46. Bushy pondweed (*Najas flexilis*). Common.
47. Water smartweed (*Polygonum amphibium*). Common.
48. White water crowfoot (*Batrachium divaricatum*). Common.
49. Water milfoil (*Myriophyllum spicatum*).
50. Spatterdock (*Nymphaea advena*). Common.
51. Bladderwort (*Utricularia vulgaris*). Common.

FLOATING PLANTS.

Dominant:
52. Star duckweed (*Lemna trisulca*).

Secondary species:
53. Small duckweed (*Lemna minor*).
54. Big duckweed (*Spirodela polyrhiza*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 21, 24 (33), 32, 34, 39, 41, 43, 46, 52, 53, and 54; those of less importance are: Nos. 1, 2, 5, 6 (25), 7, 11, 20, 23, 26 (36), 27, 29, 37, 42, 44, 45, 47, 49, and 50; the remainder are of no known value.

WATTS LAKE, CHERRY COUNTY.

August 29, 1915.

Description.—Large marsh at west end of lake, which it is not safe to penetrate on account of the soft mucky bottom. Lake proper is mostly open water; depth 5 to 6 feet; bottom largely muck. No inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

Grasses, sedges, etc., as for Dewey and Hackberry Lakes. In addition the following:

1. Sensitive fern (*Onoclea sensibilis*).* Common on mucky shore; in fruit.
2. Water smartweed (*Polygonum amphibium*).* Not abundant; flowers.
3. Whorled loosestrife (*Lysimachia quadrifolia*).* Sparse.

MARSH PLANTS.

Dominants:
4. Reed (*Phragmites communis*).
5. Big bulrush (*Scirpus occidentalis*).

Secondary species:
6. Bur reed (*Sparganium eurycarpum.*)
7. Cat-tail (*Typha latifolia*).
8. Wapato (*Sagittaria latifolia*).* Common.
9. Wild rice (*Zizania palustris*). Abundant. A rice field in middle of marsh comprises about one-fifth of entire area.
10. Spike rush (*Eleocharis acuminata*).
11. Sedge (*Carex utriculata*).
12. Rush (*Juncus dudleyi*). Sparse.
13. Willows along marsh bank (*Salix*).

SEMISUBMERGED PLANTS.

Dominants:
14. Big bulrush (*Scirpus occidentalis*).
15. Spike rush (*Eleocharis acuminata*).
16. Wapato (*Sagittaria latifolia*). Common.
17. Wild rice (*Zizania palustris*). Sparse; shows effect of high water.
18. Reed (*Phragmites communis*). Common.
19. Water smartweed (*Polygonum amphibium*).
20. Water hemlock (*Cicuta maculata*). Sparse.

Other smaller sedges and rushes listed among marsh plants occur also in shallow water.

SUBMERGED PLANTS.

Dominant:
21. Eelgrass pondweed (*Potamogeton compressus*).

Secondary species:
22. Water moss (*Drepanocladus* sp.) Common.
23. Sago pondweed (*Potamogeton pectinatus*). Abundant.
24. Small pondweed (*Potamogeton pusillus*). Common.
25. Curly pondweed (*Potamogeton perfoliatus richardsonii*). Common.
26. Illinois pondweed (*Potamogeton illinoensis*). Common.
27. Long-leaved pondweed (*Potamogeton americanus*). Common.
28. Bushy pondweed (*Najas flexilis*). Common.
29. Water smartweed (*Polygonum amphibium*).
30. Coontail (*Ceratophyllum demersum*). Common.
31. Spatterdock (*Nymphaea advena*). Common.
32. Water milfoil (*Myriophyllum spicatum*). Abundant.
33. An alga (*Nostoc verrucosum*). Abundant.

FLOATING PLANTS.

34. Big duckweed (*Spirodela polyrhiza*).
35. Small duckweed (*Lemna minor*).
36. Star duckweed (*Lemna trisulca*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 5 (14), 8 (16), 9 (17), 23, 24, 28, 30, 34, 35, and 36; those of less importance are: Nos. 2 (19, 29), 6, 10 (15), 11, 21, 25, 26, 27, 31, and 32; the remainder are of no known value.

TROUT LAKE, CHERRY COUNTY.

August 31, 1915.

Description.—Considerable marsh on southeast side of lake; small amount on south and west sides. Open water extensive; greatest average depth 8 to 9 feet. Outlet into Ballard swamp.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Grasses, sedges, etc., as listed for neighboring bodies of water. In addition the following:

1. Sedge (*Carex scoparia*).* On wet shore and in bog.

MARSH PLANTS.

Dominants:
2. Reed (*Phragmites communis*).
3. Big bulrush (*Scirpus occidentalis*).

Secondary species:
4. Wapato (*Sagittaria latifolia*). Common.
5. Wild rice (*Zizania palustris*). Abundant.
6. Spike rush (*Eleocharis acuminata*). Common.
7. Water hemlock (*Cicuta maculata*). Sparse.
8. Burweed (*Iva xanthifolia*). Common.

Other smaller sedges and rushes listed for neighboring bodies of water are common in the marsh and bog areas. The marsh consists of rice patches alternating with rush fields.

SEMISUBMERGED PLANTS.

Dominant:
9. Big bulrush (*Scirpus occidentalis*).

Secondary species:
10. Cat-tail (*Typha latifolia*). Sparse.
11. Wapato (*Sagittaria latifolia*). Common.
12. Reed (*Phragmites communis*). Abundant.
13. Dropseed (*Sporobolus asperifolius*). In shallow water.
14. River bulrush (*Scirpus fluviatilis*).* Sparse.
15. Spike rush (*Eleocharis acuminata*).
16. Water smartweed (*Polygonum amphibium*). Common.
17. Water hemlock (*Cicuta maculata*). In shallow water.

SUBMERGED PLANTS.

Dominants:
18. Coontail (*Ceratophyllum demersum*). Abundant.
19. Water milfoil (*Myriophyllum spicatum*). Abundant.

Secondary species:
20. Small pondweed (*Potamogeton pusillus*).*

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 3 (9), 4 (11), 5, 14, 18, and 20; those of less importance are: Nos. 1, 6 (15), 16, and 19; the remainder are of no known value.

PELICAN LAKE, CHERRY COUNTY.

September 1, 1915.

Description.—Very little marsh; small swamp region at west end. Depth 7 to 8 feet (average greatest); bottom mostly mucky. No outlet or inlet.

DISTRIBUTION OF VEGETATION.

The neck of water connecting Rat and Beaver Lakes has a sparse stand of wild rice (*Zizania palustris*), and the following are abundant: Wapato (*Sagittaria latifolia*) and water smartweed (*Polygonum amphibium*). The submerged vegetation is about the same as for Rat Lake.

SHORE PLANTS.

A mixture of grasses, etc., as listed for neighboring lakes.[1]

MARSH PLANTS.

1. Marsh fern (*Dryopteris thelypteris*). Common.
2. Cat-tail (*Typha latifolia*). Common.
3. Bur reed (*Sparganium eurycarpum*). Common.
4. Wapato (*Sagittaria latifolia*). Abundant.
5. Reed (*Phragmites communis*). Abundant.
6. Big bulrush (*Scirpus occidentalis*). Abundant.
7. Spike rush (*Eleocharis acicularis*). Common.
8. Richweed (*Pilea pumila*).
9. Marsh mint (*Stachys palustris*).
10. Mint (*Mentha canadensis*).
11. Sticktight (*Bidens trichosperma*). Common.

SEMISUBMERGED PLANTS.

Dominant:

12. Big bulrush (*Scirpus occidentalis*).

Secondary species:

13. Cat-tail (*Typha latifolia*). Common.
14. Wapato (*Sagittaria latifolia*). Common.
15. Wild rice (*Zizania palustris*). Common.
16. Reed (*Phragmites communis*). Common.
17. Spike rush (*Eleocharis acuminata*). A few acres of rice along northeast shore in shallow water.

SUBMERGED PLANTS.

Dominants:

18. Variable pondweed (*Potamogeton heterophyllus*).* Immature fruit.
19. Coontail (*Ceratophyllum demersum*).

Secondary species:

20. Sago pondweed (*Potamogeton pectinatus*).
21. Floating pondweed (*Potamogeton natans*).
22. Small pondweed (*Potamogeton pusillus*). Abundant.
23. Bushy pondweed (*Najas flexilis*). Abundant.
24. Water smartweed (*Polygonum amphibium*).

FLOATING PLANTS.

25. Big duckweed (*Spirodela polyrhiza*). Common.
26. Small duckweed (*Lemna minor*). Common.
27. Star duckweed (*Lemna trisulca*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 4 (14), 6 (12), 15, 18, 19, 20, 22, 23, 25, 26, and 27; those of less importance are: Nos. 3, 7, 11, 17, 21, and 24; the remainder are of no known value.

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[1] The following two species have been recorded from Pelican Lake: Wood chess (*Bromus ciliatus*), Smith, J. G., Rept. Nebraska State Bd. Agr., 1892, p. 286, (1893); and a sedge (*Carex douglasii*), Smith, J. G., and Pound, Roscoe, Botanical Survey of Nebraska II, p. 26, 1893. The last-named plant may have some slight value as duck food.

RAT LAKE, CHERRY COUNTY.

September 3–4, 1915.

Description.—Little or no marsh. Fresh water, mostly open; greatest average depth, 8 feet; bottom mostly sandy. Inlet from Beaver Lake, these two lakes being connected by a strip of water a few rods wide.

Distribution of Vegetation.

SHORE PLANTS.

1. Wild millet (*Echinochloa crus-galli*).* Mature fruit; common.
2. Satin grass (*Muhlenbergia foliosa*).* Flowers.
3. Wild rye (*Elymus canadensis*). Common.
4. Indian grass (*Sorghastrum nutans*).* Flowers.
5. Richweed (*Pilea pumila*).
6. Water smartweed (*Polygonum amphibium*). Common.
7. Bush clover (*Lespedeza capitata*).* Sparse.
8. Prairie trefoil (*Hosackia americana*).* Mature fruit; abundant on higher sandy shore of lake margin.
9. Evening primrose (*Oenothera oakesiana*).* Sparse.
10. Mint (*Mentha canadensis*).
11. Blue verbena (*Verbena hastata*).* Flowers.
12. Prairie sage (*Artemisia gnaphalodes*).* Flowers; rare.
13. Goldenrod (*Solidago altissima*).* Flowers.
14. Bushy goldenrod (*Euthamia graminifolia*).* Flowers.
15. White wreath-aster (*Aster multiflorus*).* Flowers; common.

Other grasses, small sedges, etc., as listed for neighboring bodies of water.

MARSH PLANTS.

Little or no marsh.

SEMISUBMERGED PLANTS.

Dominants:

16. Wapato (*Sagittaria latifolia*).
17. Spike rush (*Eleocharis acuminata*).

Secondary species:

18. Big bulrush (*Scirpus occidentalis*).
19. Water smartweed (*Polygonum amphibium*).* Mature fruit.

SUBMERGED PLANTS.

Dominant:

20. Coontail (*Ceratophyllum demersum*).

Secondary species:

21. Musk grass (*Chara* spp).* Common.
22. Floating pondweed (*Potamogeton natans*).
23. Curly pondweed (*Potamogeton perfoliatus richardsonii*). Common.
24. Small pondweed (*Potamogeton pusillus*). Abundant.
25. Sago pondweed (*Potamogeton pectinatus*). Common.
26. Illinois pondweed (*Potamogeton illinoensis*). Common.
27. Bushy pondweed (*Najas flexilis*). Common.
28. Spike rush (*Eleocharis acicularis*). Abundant.
29. Water smartweed (*Polygonum amphibium*). Rare.
33. Star duckweed (*Lemna trisulca*). Abundant.

FLOATING PLANTS.

31. Big duckweed (*Spirodela polyrhiza*).
32. Small duckweed (*Lemna minor*).
33. Star duckweed (*Lemna trisulca*). Abundant.

Wild-duck food.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 16, 18, 20, 21, 24, 25, 27, 31, 32, and 33; those of less importance are: Nos. 1, 6, 17, 19 (29), 22, 23, 26, 28, and 30; the remainder are of no known value.

BEAVER LAKE, CHERRY COUNTY.

September 3–4, 1915.

Description.—No marsh, grazed to shore line. Average greatest depth, 14 to 15 feet; bottom sandy.

Distribution of Vegetation.

SHORE PLANTS.

Upland vegetation to shore line; closely grazed. No marsh.

SEMISUBMERGED PLANTS.

1. Wapato (*Sagittaria latifolia*). Scarce.
2. Big bulrush (*Scirpus occidentalis*). Scarce.

SUBMERGED PLANTS.

Dominant:

3. Coontail (*Ceratophyllum demersum*).

Secondary species:

4. Sago pondweed (*Potamogeton pectinatus*).
5. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
6. Illinois pondweed (*Potamogeton illinoensis*).
7. Small pondweed (*Potamogeton pusillus*). Abundant.
8. Floating pondweed (*Potamogeton natans*).
9. Spike rush (*Eleocharis acicularis*).
10. Water smartweed (*Polygonum amphibium*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 1, 2, 3, 4, and 7; those of less importance are: Nos. 5, 6, 8, 9, and 10; the remainder are of no known value.

WENDLER SWAMP, CHERRY COUNTY.

September 4 and 10, 1915.

Description.—Good stand of wild rice over entire swamp. Fresh water, fed by springs; very little open; bottom very mucky; average greatest depth, 3 to 4 feet; no inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

1. Arrow-grass (*Triglochin maritima*). Common.
2. Wapato (*Sagittaria latifolia*).
3. Wild millet (*Echinochloa crus-galli*). Common.
4. Switchgrass (*Panicum virgatum*).
5. Rice cut-grass (*Homalocenchrus oryzoides*).
6. Satin grass (*Muhlenbergia foliosa*).
7. Sedge (*Carex scoparia*).* Abundant.
8. Rush (*Juncus torreyi*).*
9. Rush (*Juncus marginatus*).*
10. Water smartweed (*Polygonum amphibium*).

Other grasses, sedges, etc., as listed for neighboring bodies of water.

SEMISUBMERGED PLANTS.

Dominants:

11. Wild rice (*Zizania palustris*).
12. Reed (*Phragmites communis*).
13. Big bulrush (*Scirpus occidentalis*).

Secondary species:

14. Cat-tail (*Typha latifolia*).
15. Bur reed (*Sparganium eurycarpum*).
16. Wapato (*Sagittaria latifolia*).
17. Spike rush (*Eleocharis acuminata*).
18. Tall dock (*Rumex altissimus*).
19. Water hemlock (*Cicuta maculata*).*
20. Buckbean (*Menyanthes trifoliata*).*

SUBMERGED PLANTS.

Dominants:

21. Coontail (*Ceratophyllum demersum*).
22. Spatterdock (*Nymphaea advena*).* Seedlings.

Secondary species:

23. Musk grass (*Chara* sp.).* Abundant.
24. Water moss (*Drepanocladus* sp.). Abundant.
25. Sago pondweed (*Potamogeton pectinatus*). Abundant.
26. Eelgrass pondweed (*Potamogeton compressus*). Common.
27. Small pondweed (*Potamogeton pusillus*). Common.
28. Illinois pondweed (*Potamogeton illinoensis*).
29. Floating pondweed (*Potamogeton natans*).
30. Variable pondweed (*Potamogeton heterophyllus*).
31. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
32. Bushy pondweed (*Najas flexilis*). Common.
33. Water smartweed (*Polygonum amphibium*). Abundant.
34. White water crowfoot (*Batrachium divaricatum*).
35. Spatterdock (*Nymphaea advena*). Common.
36. Water milfoil (*Myriophyllum spicatum*). Abundant.
37. Bladderwort (*Utricularia vulgaris*). Abundant.

FLOATING PLANTS.

38. Big duckweed (*Spirodela polyrhiza*).
39. Small duckweed (*Lemna minor*).
40. Star duckweed (*Lemna trisulca*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 2 (16), 3, 11, 13, 21, 23, 25, 27, 30, 32, 38, 39, and 40; those of less importance are: Nos. 1, 4, 5, 7, 10 (33), 15, 17, 20, 22 (35), 26, 28, 29, 31, 34, and 36; the remainder are of no known value.

SWEETWATER LAKES, CHERRY COUNTY.

September 6, 1915.

Description.—Marshy at west end. Well filled with submerged vegetation. Average greatest depth about 3 to 3½ feet; bottom mostly sandy. Overflow from one lake to another during high water.

Distribution of Vegetation.

SHORE PLANTS.

Typical mixture of grasses, etc., as listed for other lakes. Grazed mostly to shore line.

MARSH PLANTS.

1. Water plantain (*Alisma subcordatum*). Common.
2. Wapato (*Sagittaria latifolia*).
3. Reed (*Phragmites communis*).
4. Big bulrush (*Scirpus occidentalis*).
5. Spike rush (*Eleocharis acuminata*).
6. Rush (*Juncus torreyi*).*
7. St. John's-wort (*Hypericum punctatum*).* Mature fruit.
8. Willow herb (*Epilobium lineare*).*
9. Water hemlock (*Cicuta maculata*).
10. Water hemlock (*Cicuta bulbifera*).*
11. Skullcap (*Scutellaria galericulata*).* Flowers.
12. Purple boneset (*Eupatorium purpureum*).* Flowers.
13. Sticktight (*Bidens trichosperma*).* Flowers.
14. Willow aster (*Aster salicifolius*).* Flowers.
15. Sunflower (*Helianthus annuus*).* Flowers.

SEMISUBMERGED PLANTS.

Dominants:

16. Wapato (*Sagittaria latifolia*).
17. Spike rush (*Eleocharis acuminata*).

Secondary species:

18. Water plantain (*Alisma subcordatum*).*
19. Cord-grass (*Spartina michauxiana*).
20. Big bulrush (*Scirpus occidentalis*).
21. Water smartweed (*Polygonum amphibium*).

SUBMERGED PLANTS.

Dominants:

22. Musk grass (*Chara* sp.).
23. Small pondweed (*Potamogeton pusillus*).
24. Waterweed (*Philotria canadensis*).* Flowers; only place found in this group of lakes in eastern Cherry County.

Secondary species:

25. Water moss (*Drepanocladus* sp.). Abundant.
26. Sago pondweed (*Potamogeton pectinatus*). Abundant.
27. Variable pondweed (*Potamogeton heterophyllus*).
28. Curly pondweed (*Potamogeton perfoliatus richardsonii*). Common.
29. Bushy pondweed (*Najas flexilis*).
30. Water smartweed (*Polygonum amphibium*).
31. White water crowfoot (*Batrachium divaricatum*).* Common.
32. Coontail (*Ceratophyllum demersum*).
33. Spatterdock (*Nymphaea advena*).

Algae abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 2 (16), 4 (20), 22, 23, 26, 27, 29, and 32; those of less importance are: Nos. 1 (18), 5 (17), 13, 19, 21 (30), 24, 28, 31, and 33; the remainder are of no known value.

TWENTY-ONE LAKE, CHERRY COUNTY.

September 6, 1915.

Description.—Marshy at west end. Water perhaps a little alkaline; average greatest depth, 7½ to 8 feet; bottom, sandy. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Grasses, sedges, etc., as for other lakes, and in addition the following:

1. Long-leaved reedgrass (*Calamovilfa longifolia*).*
2. Big bulrush (*Scirpus occidentalis*). Abundant on wet shore.
3. Sedge (*Carex diandra*).* Mature fruit.
4. Mint (*Mentha canadensis*).*
5. Goldenrod (*Solidago altissima*).*
6. Groundsel (*Senecio riddellii*).* Flowers.

SEMISUBMERGED PLANTS.

Dominant:

7. Big bulrush (*Scirpus occidentalis*).

Secondary species:

8. Wapato (*Sagittaria latifolia*). Abundant.
9. Reed (*Phragmites communis*). Abundant.
10. Cord-grass (*Spartina michauxiana*).
11. Spike rush (*Eleocharis acuminata*). Abundant.
12. Water smartweed (*Polygonum amphibium*).

SUBMERGED PLANTS.

Dominants:

13. Sago pondweed (*Potamogeton pectinatus*).
14. Curly pondweed (*Potamogeton perfoliatus richardsonii*).

Secondary species:

15. Floating pondweed (*Potamogeton natans*).
16. Illinois pondweed (*Potamogeton illinoensis*).
17. Eelgrass pondweed (*Potamogeton compressus*).
18. Small pondweed (*Potamogeton pusillus*). Abundant.
19. Bushy pondweed (*Najas flexilis*).
20. Coontail (*Ceratophyllum demersum*). Common.
21. Bladderwort (*Utricularia vulgaris*). Common.

–. Algae abundant.

FLOATING PLANTS.

22. Big duckweed (*Spirodela polyrhiza*).
23. Small duckweed (*Lemna minor*).
24. Star duckweed (*Lemna trisulca*). Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 2 (7), 8, 13, 18, 19, 20, 22, 23, and 24; those of less importance are: Nos. 3, 10, 11, 12, 14, 15, 16, and 17; the remainder are of no known value.

MARSH LAKES, CHERRY COUNTY.

September 7, 1915.

Description.—These lakes in reality form one large lake, the parts of which are distinguished only in name. Fresh water, well filled with vegetation, small proportion open; average greatest depth as follows: South Marsh Lake, 7 to 8 feet; Middle Marsh Lake, 10 to 12 feet; and North Marsh Lake, 6 to 7 feet. Bottom in general mucky, in a few places sandy. No inlet or outlet.

Distribution of Vegetation.

Very little open water on South Marsh Lake. Large body of open water, surrounded by dense growth of vegetation in Middle Marsh Lake.

SHORE PLANTS.

In addition to grasses, sedges, etc., listed for other lakes, there are:

1. Three-way sedge (*Dulichium arundinaceum*).*
2. Water pepper (*Polygonum punctatum*).* Mature fruit.
3. Three-finger (*Potentilla monspeliensis*).*
4. Water hemlock (*Cicuta bulbifera*).*
5. Thorowort (*Eupatorium perfoliatum*).* Flowers.
6. Purple boneset (*Eupatorium purpureum*).*
7. Sunflower (*Helianthus annuus*).* Flowers.
8. Sticky aster (*Machaeranthera sessiliflora*).* Flowers.
9. Bur marigold (*Bidens laevis*).* Flowers.
10. New England aster (*Aster novae-angliae*).* Flowers to immature fruit.
11. Rush lettuce (*Lygodesmia juncea*).* Flowers.

SEMISUBMERGED PLANTS.

Dominants:

12. Reed (*Phragmites communis*).
13. Big bulrush (*Scirpus occidentalis*).

Secondary species:

14. Cat-tail (*Typha latifolia*). Common.
15. Bur reed (*Sparganium eurycarpum*). Sparse.
16. Wapato (*Sagittaria latifolia*). Abundant.
17. Wild rice (*Zizania palustris*). Abundant.
18. Spike rush (*Eleocharis acuminata*). Abundant.
19. Bristly sedge (*Carex comosa*). Abundant.
20. Rush (*Juncus marginatus*). A field and other scattered patches.
21. Water smartweed (*Polygonum amphibium*).

SUBMERGED PLANTS.

Dominants:

22. Water moss (*Drepanocladus* sp.).
23. Sago pondweed (*Potamogeton pectinatus*).
24. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
25. Water milfoil (*Myriophyllum spicatum*).* Immature fruit.

Secondary species:

26. Musk grass (*Chara* sp.) Common.
27. Bur reed (*Sparganium eurycarpum*). Abundant.
28. Floating pondweed (*Potamogeton natans*). Common.
29. Illinois pondweed (*Potamogeton illinoensis*).
30. Small pondweed (*Potamogeton pusillus*). Abundant.
31. Eelgrass pondweed (*Potamogeton compressus*). Common.
32. Variable pondweed (*Potamogeton heterophyllus*).
33. Bushy pondweed (*Najas flexilis*). Common.
34. Spike rush (*Eleocharis acicularis*). Abundant.
35. Water smartweed (*Polygonum amphibium*). Common.
36. White water crowfoot (*Batrachium divaricatum*).
37. Coontail (*Ceratophyllum demersum*). Abundant.
38. Spatterdock (*Nymphaea advena*). Common.
39. Bladderwort (*Utricularia vulgaris*). Common.

FLOATING PLANTS.

40. Big duckweed (*Spirodela polyrhiza*).
41. Small duckweed (*Lemna minor*).
42. Star duckweed (*Lemna trisulca*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 13, 16, 17, 23, 26, 30, 32, 33, 37, 40, 41, and 42; those of less importance are: Nos. 2, 9, 15 (27), 18, 19, 21 (35), 24, 25, 28, 29, 31, 34, 36, and 38; the remainder are of no known value.

RED DEER LAKE, CHERRY COUNTY.

September 10, 1915.

Description.—Little or no marsh. Mostly open water; average greatest depth, 7 to 8 feet. Bottom generally sandy. Inlet from Ballard Swamp during overflow period; outlet into Goose Creek and thence into Niobrara River.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Typical mixture of grasses, sedges, goldenrods, etc., as listed for other lakes, including the following:

1. Saltgrass (*Distichlis spicata*).

SEMISUBMERGED PLANTS.

Dominants:
2. Cat-tail (*Typha latifolia*).
3. Big bulrush (*Scirpus occidentalis*).

Secondary species:
4. Wapato (*Sagittaria latifolia*). Common.
5. Reed (*Phragmites communis*). Common.

SUBMERGED PLANTS.

Dominants:
6. Sago pondweed (*Potamogeton pectinatus*).
7. Coontail (*Ceratophyllum demersum*).

Secondary species:
8. Musk grass (*Chara* sp.). Abundant.
9. Floating pondweed (*Potamogeton natans*).
10. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
11. Illinois pondweed (*Potamogeton illinoensis*).
12. Small pondweed (*Potamogeton pusillus*).
13. White water crowfoot (*Batrachium divaricatum*).

FLOATING PLANTS.

14. Greater duckweed (*Spirodela polyrhiza*). Abundant.
15. Small duckweed (*Lemna minor*). Abundant.
16. Star duckweed (*Lemna trisulca*). Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 3, 4, 6, 7, 8, 12, 14, 15, and 16; those of less importance are: Nos. 1, 9, 10, 11, and 13; the remainder are of no known value.

BALLARD SWAMP, CHERRY COUNTY.

September 10, 1915.

Description.—Vegetation abundant and in good condition. Fresh water; very little open; depth, 4 to 5 feet. Bottom in general very mucky; sandy in a few places. Inlet from Trout Lake; outlet during high water into Red Deer Lake.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Grasses, etc., as listed for neighboring waters, including the following:

1. Common plantain (*Plantago major*).* Mature fruit.
2. Plantain (*Plantago purshii*).* Flowers.
3. Satin grass (*Muhlenbergia squarrosa*).* Flowers.
4. Tussock sedge (*Carex stricta*).* Mature fruit.
5. Closed gentian (*Gentiana andrewsii*).* Flowers.
6. Buckbean (*Menyanthes trifoliata*).*
7. Purple foxglove (*Gerardia besseyana*).*
8. Small cleavers (*Galium trifidum*).* Immature fruit.
9. Goldenrod (*Solidago rigida*).* Flowers, to mature fruit.
10. Goldenrod (*Solidago serotina*).* Flowers.
11. Bushy goldenrod (*Euthamia graminifolia*).* Flowers.
12. Sticktight (*Bidens trichosperma*).* Flowers, to mature fruit.
13. Willow aster (*Aster salicifolius*).* Flowers.

SEMISUBMERGED PLANTS.

Dominants:

14. Wild rice (*Zizania palustris*). Good stand of rice over most of swamp area.
15. Reed (*Phragmites communis*).
16. Big bulrush (*Scirpus occidentalis*).

Secondary species:

17. Wapato (*Sagittaria latifolia*).
18. River bulrush (*Scirpus fluviatilis*).
19. Spike rush (*Eleocharis acuminata*).
20. Sedge (*Carex scoparia*).
21. Golden dock (*Rumex persicarioides*).* Mature fruit; sparse.
22. Water hemlock (*Cicuta maculata*).

SUBMERGED PLANTS.

Dominants:

23. Small pondweed (*Potamogeton pusillus*).
24. Coontail (*Ceratophyllum demersum*).
25. Spatterdock (*Nymphaea advena*).* Seedlings.

Secondary species:

26. Musk grass (*Chara* sp.). Abundant.
27. Floating pondweed (*Potamogeton natans*).
28. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
29. Illinois pondweed (*Potamogeton illinoensis*).
30. Eelgrass pondweed (*Potamogeton compressus*). Abundant.
31. Sago pondweed (*Potamogeton pectinatus*). Abundant.
32. Small pondweed (*Potamogeton pusillus*).
33. Bushy pondweed (*Najas flexilis*). Common.
34. Water smartweed (*Polygonum amphibium*).
35. White water crowfoot (*Batrachium divaricatum*).
36. Water milfoil (*Myriophyllum spicatum*).

FLOATING PLANTS.

37. Big duckweed (*Spirodela polyrhiza*). Abundant.
38. Small duckweed (*Lemna minor*). Abundant.
39. Star duckweed (*Lemna trisulca*). Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 14, 16, 17, 18, 23, 24, 26, 31, 32, 33, 37, 38, and 39; those of less importance are: Nos. 4, 6, 8, 12, 19, 20, 25, 27, 28, 29, 30, 34, 35, and 36; the remainder are of no known value.

BIG ALKALI LAKE, CHERRY COUNTY.

September 13, 1915.

Description.—Little or no marsh. Water, alkaline; average greatest depth, 10 to 12 feet; bottom, sandy. No outlet or inlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Grasses, sedges, goldenrods, etc., as listed for neighboring lakes:

1. Saltgrass (*Distichlis spicata*). Common.

SEMISUBMERGED PLANTS.

Dominants:

2. Big bulrush (*Scirpus occidentalis*).
3. Spike rush (*Eleocharis acuminata*).

SUBMERGED PLANTS.

4. Small pondweed (*Potamogeton pusillus*). Abundant.
5. Sago pondweed (*Potamogeton pectinatus*). Sparse.
6. Water milfoil (*Myriophyllum spicatum*). Sparse.

—. Very little submerged vegetation.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 2, 4, and 5; those of less importance are: Nos. 1, 3, and 6.

MOLLY MARSH, CHERRY COUNTY.

September 13,1915.

Description.—Comparatively little open water; depth, 3 to 4 feet; bottom mucky. No outlet or inlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

A mixture of grasses, sedges, etc., as found on near-by lakes; nothing new.

SEMISUBMERGED PLANTS.

Dominant:

1. Great bulrush (*Scirpus occidentalis*).

Secondary species:

2. Bur reed (*Sparganium eurycarpum*).
3. Wapato (*Sagittaria latifolia*).
4. Reed (*Phragmites communis*).
5. River bulrush (*Scirpus fluviatilis*). Common.
6. Spike rush (*Eleocharis acuminata*).
7. Water smartweed (*Polygonum amphibium*). Common.
8. Water hemlock (*Cicuta maculata*). Sparse.

SUBMERGED PLANTS.

9. Sago pondweed (*Potamogeton pectinatus*).
10. Coontail (*Ceratophyllum demersum*).

Secondary species:

11. Floating pondweed (*Potamogeton natans*).
12. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
13. Illinois pondweed (*Potamogeton illinoensis*).
14. Eelgrass pondweed (*Potamogeton compressus*).
15. Small pondweed (*Potamogeton pusillus*). Common.
16. Bushy pondweed (*Najas flexilis*). Common.
17. Water smartweed (*Polygonum amphibium*).
18. White water crowfoot (*Batrachium divaricatum*). Abundant.
19. Spatterdock (*Nymphaea advena*).
20. Water milfoil (*Myriophyllum spicatum*).
21. Bladderwort (*Utricularia vulgaris*). Common.

FLOATING PLANTS.

22. Big duckweed (*Spirodela polyrhiza*). Abundant.
23. Small duckweed (*Lemna minor*). Abundant.
24. Star duckweed (*Lemna trisulca*). Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 1, 3, 5, 9, 10, 15, 16, 22, 23, and 24; those of less importance are: Nos. 2, 6, 7 (17), 11, 12, 13, 14, 18, 19, and 20; the remainder are of no known value.

HAY LAKE, CHERRY COUNTY.

September 14, 1915.

Description.—No marsh. Lake well filled with submerged vegetation; bottom mostly mucky; depth, 6 feet. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

In addition to others listed for near-by waters, there are:

1. Switchgrass (*Panicum virgatum*).* Mature fruit.
2. White wreath-aster (*Aster multiflorus*).* Flowers.

SEMISUBMERGED PLANTS.

Dominant:
3. Big bulrush (*Scirpus occidentalis*).

Secondary species:
4. Cat-tail (*Typha latifolia*).
5. Spike rush (*Eleocharis acuminata*).

SUBMERGED PLANTS.

Dominant:
6. Sago pondweed (*Potamogeton pectinatus*).*

Secondary species:
7. Curly pondweed (*Potamogeton perfoliatus richardsonii*).
8. Illinois pondweed (*Potamogeton illinoensis*).
9. Eelgrass pondweed (*Potamogeton compressus*).
10. Bushy pondweed (*Najas flexilis*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 3, 6, and 10; those of less importance are: Nos. 1, 5, 7, 8, and 9; the remainder are of no known value.

SOUTH CODY LAKE, CHERRY COUNTY.

September 18–19, 1915.

Description.—Marshy at east and west ends; considerable open water: average greatest depth, 4 to 5 feet; bottom generally mucky. Inlet from the west; overflow into North Cody Lake during high water.

Distribution of Vegetation.

SHORE PLANTS.

Typical wet-meadow plants.

1. Arrow-grass (*Triglochin maritima*).* Mature fruit.
2. Wild millet (*Echinochloa crus-galli*).*
3. Switchgrass (*Panicum virgatum*).*
4. Cord-grass (*Spartina michauxiana*).*
5. Squirrel-tail (*Hordeum jubatum*).*
6. Satin grass (*Muhlenbergia foliosa*).*
7. Sedge (*Cyperus speciosus*).* Mature fruit.
8. Rush (*Juncus torreyi*).*
9. Rush (*Juncus balticus*).*
10. Richweed (*Pilea pumila*).* Immature fruit.
11. Water smartweed (*Polygonum amphibium*).* Flowers to mature fruit.
12. Water pepper (*Polygonum punctatum*).*
13. Heart's-ease (*Polygonum pennsylvanicum*).* Mature fruit.
14. Lamb's-quarters (*Chenopodium album*).*
15. Water hemlock (*Cicuta bulbifera*).*
16. Marsh mint (*Stachys palustris*).* Flowers.
17. Mint (*Mentha canadensis*).* Flowers.
18. Water hoarhound (*Lycopus asper*).* Mature fruit.
19. Hairy germander (*Teucrium occidentale*).* Mature fruit.
20. Small cleavers (*Galium trifidum*).* Immature fruit.
21. Ragweed (*Ambrosia elatior*).* Flowers, to mature fruit.
22. Goldenrod (*Solidago altissima*).* Flowers.
23. Sunflower (*Helianthus annuus*).* Flowers.
24. Bur marigold (*Bidens laevis*).* Flowers.
25. Willow aster (*Aster salicifolius*).* Flowers.

SEMISUBMERGED PLANTS.

Dominants:

26. Tule (*Scirpus validus*).* Mature fruit.
27. Reed (*Phragmites communis*).*

Secondary species:

28. Cat-tail (*Typha latifolia*).*
29. Bur reed (*Sparganium eurycarpum*).* Mature fruit; common.
30. Water plantain (*Alisma subcordatum*).* Common.
31. Wapato (*Sagittaria latifolia*).* Mature fruit.
32. Wild rice (*Zizania palustris*).*
33. Cord-grass (*Spartina michauxiana*). Abundant.
34. Three-square (*Scirpus americanus*).* Common.
35. River bulrush (*Scirpus fluviatilis*).* Mature fruit; common.
36. Spike rush (*Eleocharis*, probably *acicularis*).*
37. Bristly sedge (*Carex comosa*).* Mature fruit; abundant.
38. Curly dock (*Rumex crispus*).* Mature fruit; common.
39. Water smartweed (*Polygonum amphibium*).
40. Water hemlock (*Cicuta maculata*).* Flowers, to immature fruit.
41. Swamp milkweed (*Asclepias incarnata*).* Mature fruit.

SUBMERGED PLANTS.

Dominants:

42. Floating pondweed (*Potamogeton natans*).*
43. Coontail (*Ceratophyllum demersum*).*

Secondary species:

44. Musk grass (*Chara* sp.).* Common.
45. Water moss (*Drepanocladus kneiffi* var. *laxum*).
46. Curly pondweed (*Potamogeton perfoliatus richardsonii*).*
47. Variable pondweed (*Potamogeton heterophyllus*).
48. Sago pondweed (*Potamogeton pectinatus*).* Abundant.
49. Eelgrass pondweed (*Potamogeton compressus*).* Common.
50. Small pondweed (*Potamogeton pusillus*).* Winter buds present; common.
51. Bushy pondweed (*Najas flexilis*).* Common.
52. Spike rush (*Eleocharis*, probably *acicularis*).* Common.
53. Water smartweed (*Polygonum amphibium*).
54. Yellow water-crowfoot (*Ranunculus delphinifolius*).
55. Water milfoil (*Myriophyllum spicatum*).* Abundant.
56. Bladderwort (*Utricularia vulgaris*). Common.

FLOATING PLANTS.

57. Big duckweed (*Spirodela polyrhiza*).* Common.
58. Small duckweed (*Lemna minor*).* Common.
59. Star duckweed (*Lemna trisulca*).* Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 26, 31, 32, 35, 43, 44, 48, 50, 51, 57, 58, and 59; those of less importance are: Nos. 1, 2, 3, 4 (33), 7 (39, 53), 12, 13, 24, 29, 30, 34, 36, 37, 42, 46, 49, 54, and 55; the remainder are of no known value.

NORTH CODY LAKE, CHERRY COUNTY.

September 20, 1915.

Description.—Average greatest depth 4 feet; bottom generally mucky. Connected with South Cody Lake during high water.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

–. Typical wet-meadow plants.
1. Cord-grass (*Spartina michauxiana*).
2. Wild millet (*Echinochloa crus-galli*).
3. Switchgrass (*Panicum virgatum*).
4. Squirrel-tail (*Hordeum jubatum*).
5. Satin grass (*Muhlenbergia foliosa*).
6. Sedge (*Cyperus speciosus*).
7. Rush (*Juncus torreyi*).
8. Rush (*Juncus balticus*).
9. Richweed (*Pilea pumila*).
10. Water smartweed (*Polygonum amphibium*).
11. Water pepper (*Polygonum punctatum*).
12. Lamb's-quarters (*Chenopodium album*).
13. Water hemlock (*Cicuta bulbifera*).
14. Water hoarhound (*Lycopus asper*).
15. Marsh mint (*Stachys palustris*).
16. Hairy germander (*Teucrium occidentale*).
17. Small cleavers (*Galium trifidum*).
18. Ragweed (*Ambrosia elatior*).
19. Goldenrod (*Solidago altissima*).
20. Bur marigold (*Bidens laevis*).
21. Sunflower (*Helianthus annuus*).
22. Willow aster (*Aster salicifolius*).

SEMISUBMERGED PLANTS.

Dominants:
23. Reed (*Phragmites communis*).
24. Tule (*Scirpus validus*).

Secondary species:
25. Cat-tail (*Typha latifolia*).
26. Bur reed (*Sparganium eurycarpum*). Common.
27. Water plantain (*Alisma subcordatum*).* Common.
28. Wapato (*Sagittaria latifolia*).
29. Wild rice (*Zizania palustris*). Abundant.
30. Cord-grass (*Spartina michauxiana*). Abundant.
31. Three-square (*Scirpus americanus*). Common.
32. River bulrush (*Scirpus fluviatilis*). Common.
33. Spike rush (*Eleocharis*, probably *acicularis*).
34. Bristly sedge (*Carex comosa*). Abundant.
35. Curly dock (*Rumex crispus*). Common.
36. Water smartweed (*Polygonum amphibium*).
37. Water hemlock (*Cicuta maculata*).
38. Swamp milkweed (*Asclepias incarnata*).

SUBMERGED PLANTS.

Dominant:
39. Coontail (*Ceratophyllum demersum*).

Secondary species:
40. Musk grass (*Chara* sp.).* Common.
41. Water moss (*Drepanocladus* sp.).
42. Curly pondweed (*Potamogeton perfoliatus richardsonii*). Common.
43. Variable pondweed (*Potamogeton heterophyllus*).*
44. Sago pondweed (*Potamogeton pectinatus*). Abundant.
45. Eelgrass pondweed (*Potamogeton compressus*),
46. Bushy pondweed (*Najas flexilis*). Common.
47. Spike rush (*Eleocharis*, probably *acicularis*).
48. Water smartweed (*Polygonum amphibium*). Common.
49. Yellow water-crowfoot (*Ranunculus delphinifolius*).*
50. Water milfoil (*Myriophyllum spicatum*). Abundant.
51. Bladderwort (*Utricularia vulgaris*).*

FLOATING PLANTS.

52. Big duckweed (*Spirodela polyrhiza*). Common.
53. Small duckweed (*Lemna minor*). Common.
54. Star duckweed (*Lemna trisulca*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 24, 28, 29, 32, 39, 40, 43, 44, 46, 52, 53, and 54; those of less importance are: Nos. 1, 2, 3, 6, 10 (36, 48), 11, 20, 26, 27, 31, 33 (47), 34, 42, 45, 49, and 50; the remainder are of no known value.

RED WILLOW LAKE, CHERRY COUNTY.

October 9, 1915.

Description.—Very small amount of marsh at west end. Well filled with vegetation. Fresh water; average greatest depth 4½ feet; bottom mostly sandy. No outlet or inlet. No current except as caused by wind.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

–. Typical wet-meadow plants.
1. Saltgrass (*Distichlis spicata*).* Mature fruit; abundant.
2. Western wheat-grass (*Agropyron smithii*).* Mature fruit; common.
3. Switchgrass (*Panicum virgatum*).* Mature fruit; abundant.
4. Fragrant sedge (*Cyperus inflexus*).* Mature fruit; abundant.
5. Straw sedge (*Cyperus strigosus*).* Mature fruit; abundant.
6. Three-way sedge (*Dulichium arundinaceum*).* Common.
7. Spike rush (*Eleocharis acicularis*).* Mature fruit; abundant.
8. Rush (*Juncus marginatus*).* Mature fruit.
9. Rush (*Juncus canadensis*).* Mature fruit; abundant.
10. Rush (*Juncus balticus*).* Immature fruit.
11. Rush (*Juncus,* probably *interior*).* Mature fruit.
12. Willow (*Salix prinoides*).* Sparse.
13. Golden dock (*Rumex persicarioides*).* Mature fruit; common.
14. Bushy knotweed (*Polygonum ramosissimum*).* Mature fruit; sparse.
15. Water hemlock (*Cicuta bulbifera*).* Sparse.
16. Bugleweed (*Lycopus uniflorus*).* Flowers, to mature fruit; common.
17. Ragweed (*Ambrosia elatior*).* Flowers; common.
18. Bushy goldenrod (*Euthamia graminifolia*).* Flowers, to mature fruit; common.
19. Bur marigold (*Bidens laevis*).

SEMISUBMERGED PLANTS.

Dominant:
20. Tule (*Scirpus validus*).

Secondary species:
21. Cat-tail (*Typha latifolia*). Sparse.
22. Bur reed (*Sparganium eurycarpum*). Sparse.
23. Water plantain (*Alisma subcordatum*).* Common.
24. Wapato (*Sagittaria latifolia*). Common.
25. Cord-grass (*Spartina michauxiana*). Common.
26. Three-square (*Scirpus americanus*). Common.
27. Water smartweed (*Polygonum amphibium*).* Mature fruit; common.

SUBMERGED PLANTS.

Dominant:
28. Water milfoil (*Myriophyllum spicatum*).* Mature fruit.

Secondary species:
29. An alga (*Nostoc verrucosum*). Abundant.
30. Curly pondweed (*Potamogeton perfoliatus richardsonii*). Common.
31. Variable pondweed (*Potamogeton heterophyllus*).* Mature fruit; common.
32. Sago pondweed (*Potamogeton pectinatus*).* Mature fruit; sparse.
33. Small pondweed (*Potamogeton pusillus*).* Winter buds present.
34. Spike rush (*Eleocharis,* probably *acicularis*).* Common.
35. Water smartweed (*Polygonum amphibium*).*
36. Coontail (*Ceratophyllum demersum*).*
37. Bladderwort (*Utricularia vulgaris*).*

FLOATING PLANT.

38. Star duckweed (*Lemna trisulca*).* Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 20, 24, 31, 32, 33, 36, and 38; those of less importance are: Nos. 1, 3, 4, 5, 7, 22, 23, 25, 26, 27 (35), 28, 30, and 34; the remainder are of no known value.

WHITE WILLOW LAKE, CHERRY COUNTY.

October 10, 1915.

Description.—No marsh. Grazed to shore on south and west sides. Well filled with vegetation. Fresh water; depth 6 to 7 feet; bottom mostly sandy. No inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

–. Typical wet-meadow plants.
1. Saltgrass (*Distichlis spicata*). Abundant.
2. Western wheat-grass (*Agropyron smithii*). Common.
3. Switchgrass (*Panicum virgatum*). Abundant.
4. Bog reedgrass (*Calamagrostis inexpansa*).* Mature fruit.
5. Fragrant sedge (*Cyperus inflexus*). Abundant.
6. Straw sedge (*Cyperus strigosus*).* Mature fruit.
7. Shining sedge (*Cyperus rivularis*).* Mature fruit.
8. Spike rush (*Eleocharis palustris*).* Mature fruit.
9. Spike rush (*Eleocharis acicularis*). Abundant.
10. Three-way sedge (*Dulichium arundinaceum*). Common.
11. Sedge (*Carex vulpinoidea*).*
12. Sedge (*Carex scoparia*).* Mature fruit.
13. Rush (*Juncus marginatus*).*
14. Rush (*Juncus canadensis*). Abundant.
15. Willow (*Salix*). Sparse.
16. Golden dock (*Rumex persicarioides*). Common.
17. Bushy knotweed (*Polygonum ramosissimum*). Sparse.
18. Water hemlock (*Cicuta bulbifera*). Sparse.
19. Bugleweed (*Lycopus uniflorus*). Common.
20. Ragweed (*Ambrosia elatior*). Common.
21. Bushy goldenrod (*Euthamia graminifolia*). Common.
22. Bur marigold (*Bidens laevis*).

SEMISUBMERGED PLANTS.

Dominant:
23. Tule (*Scirpus validus*).

Secondary species:
24. Wapato (*Sagittaria latifolia*).
25. Cord-grass (*Spartina michauxiana*).* Mature fruit; common.
26. Bog reedgrass (*Calamagrostis inexpansa*).

SUBMERGED PLANTS.

Dominants:
27. Small pondweed (*Potamogeton pusillus*).* Mature fruit; winter buds.
28. Water milfoil (*Myriophyllum spicatum*).

Secondary species:
29. Musk grass (*Chara* sp.).* Common.
30. Water moss (*Drepanocladus* sp.).
31. Curly pondweed (*Potamogeton perfoliatus richardsonii*).* Abundant.
32. Variable pondweed (*Potamogeton heterophyllus*).
33. Sago pondweed (*Potamogeton pectinatus*).* Common.
34. Bushy pondweed (*Najas flexilis*). Rare.
35. Spike rush (*Eleocharis*, probably *acicularis*). Common.
36. Water smartweed (*Polygonum amphibium*). Common.
37. Bladderwort (*Utricularia vulgaris*). Common.

FLOATING PLANTS.

38. Butterflywort (*Riccia natans*).*
39. Big duckweed (*Spirodela polyrhiza*).
40. Star duckweed (*Lemna trisulca*).* Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 23, 24, 27, 29, 32, 33, 34, 39, and 40; those of less importance are: Nos. 1, 3, 5, 6, 7, 8, 9, 11, 12, 25, 28, 31, 35, and 36; the remainder are of no known value.

SPECKELMIRE LAKE, CHERRY COUNTY.

October 12, 1915.

Description.—Marsh at west end. Fresh water; average greatest depth 3 to 4 feet; bottom mostly sandy. No inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

Grasses, sedges, etc., as listed for neighboring lakes; nothing new.

SEMISUBMERGED PLANTS.

Dominants:

1. Cat-tail (*Typha latifolia*).
2. Tule (*Scirpus validus*).

Secondary species:

3. Bur reed (*Sparganium eurycarpum*).
4. Arrow-grass (*Triglochin maritima*).
5. Water plantain (*Alisma subcordatum*). Common.
6. Wapato (*Sagittaria latifolia*). Common.
7. Cord-grass (*Spartina michauxiana*). Common.
8. Reed (*Phragmites communis*). Common.
9. Bog reedgrass (*Calamagrostis inexpansa*). Common.
10. River bulrush (*Scirpus fluviatilis*).* Common; not fruiting.
11. Spike rush (*Eleocharis palustris*). Common.
12. Willow (*Salix*). Sparse.
13. Curly dock (*Rumex crispus*). Sparse.
14. Water smartweed (*Polygonum amphibium*).* Flowers; abundant.

SUBMERGED PLANTS.

Dominant:

15. Sago pondweed (*Potamogeton pectinatus*).* Practically fills lake.

Secondary species:

16. Spike rush (*Eleocharis*, probably *acicularis*). Common.
17. Water smartweed (*Polygonum amphibium*). Common.
18. Water milfoil (*Myriophyllum spicatum*).
19. Bladderwort (*Utricularia vulgaris*). Common.

FLOATING PLANTS.

20. Butterflywort (*Riccia natans*). Sparse.
21. Big duckweed (*Spirodela polyrhiza*). *rhiza*).
22. Star duckweed (*Lemna trisulca*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 2, 6, 10, 15, 21, and 22; those of less importance are: Nos. 3, 4, 5, 7, 11, 14 (17), 16, and 18; the remainder are of no known value.

YEARLING VALLEY LAKE, CHERRY COUNTY.

October 13, 1915.

Description.—Average greatest depth 3 to 4 feet. Bottom is sand muck. No inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

Grasses, etc., as listed for neighboring lakes; nothing new.

SEMISUBMERGED PLANTS.

Dominant:

1. Tule (*Scirpus validus*).

Secondary species:

2. Cat-tail (*Typha latifolia*). Sparse.
3. Bur reed (*Sparganium eurycarpum*). Sparse.
4. Water plantain (*Alisma subcordatum*). Common.
5. Wapato (*Sagittaria latifolia*). Common.
6. Cord-grass (*Spartina michauxiana*). Abundant.
7. River bulrush (*Scirpus fluviatilis*). Sparse.
8. Three-square (*Scirpus americanus*). Sparse.
9. Water smartweed (*Polygonum amphibium*). Common.
10. Water hemlock (*Cicuta maculata*), and others listed under shore vegetation for neighboring lakes growing in shallow water.

SUBMERGED PLANTS.

Dominants:

11. Sago pondweed (*Potamogeton pectinatus*).
12. Water milfoil (*Myriophyllum spicatum*).

Secondary species:

13. Variable pondweed (*Potamogeton heterophyllus*).
14. Small pondweed (*Potamogeton pusillus*). Common.
15. Spike rush (*Eleocharis acicularis*). Common.
16. Water smartweed (*Polygonum amphibium*). Sparse.
17. Bladderwort (*Utricularia vulgaris*). Sparse.

FLOATING PLANTS.

18. Butterflywort (*Riccia natans*).
19. Big duckweed (*Spirodela polyrhiza*). Common.
20. Star duckweed (*Lemna trisulca*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 1, 5, 7, 11, 13, 14, 19, and 20; those of less importance are: Nos. 3, 4, 6, 8, 9 (16), 12, and 15; the remainder are of no known value.

SILVER LAKE, CHERRY COUNTY.

October 17, 1915.

Description.—Marsh and most of the other vegetation at west end of lake; water clearer at west end of marsh than in the open where there is an alkaline appearance; bottom sandy at east half; mucky in west; average greatest depth 3 to 4 feet. Outlet to the west; since the lake is being drained, probably some current; no inlet.

Distribution of Vegetation.

SHORE PLANTS.

As for neighboring lakes.

SEMISUBMERGED PLANTS.

Dominant:

1. Tule (*Scirpus validus*).* Mature fruit, only thing growing in open water.

Secondary species:

2. Cat-tail (*Typha latifolia*).
3. Bur reed (*Sparganium eurycarpum*).
4. Water plantain (*Alisma subcordatum*).
5. Wapato (*Sagittaria latifolia*).
6. Cord-grass (*Spartina michauxiana*). Common.
7. Reed (*Phragmites communis*). Common.
8. Three-square (*Scirpus americanus*). Common.
9. Willow (*Salix*).
10. Curly dock (*Rumex crispus*). Sparse.
11. Water smartweed (*Polygonum amphibium*).
12. Water hemlock (*Cicuta maculata*). Sparse.

SUBMERGED PLANTS.

Dominant:

13. Sago pondweed (*Potamogeton pectinatus*).* The only submerged plant in open water of east half of lake.

Secondary species:

14. Floating pondweed (*Potamogeton natans*).*
15. Small pondweed (*Potamogeton pusillus*). Sparse.
16. Spike rush (*Eleocharis*, probably *acicularis*).
17. Water smartweed (*Polygonum amphibium*).
18. Water milfoil (*Myriophyllum spicatum*). Sparse.
19. Bladderwort (*Utricularia vulgaris*). Rare.

FLOATING PLANTS.

20. Big duckweed (*Spirodela polyrhiza*). Sparse.
21. Star duckweed (*Lemna trisulca*). Rare.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 1, 5, 13, 15, 20, and 21; those of less importance are: Nos. 3, 4, 6, 8, 11, 14, 16, and 17; the remainder are of no known value.

MOFFITT LAKE, GARDEN COUNTY.

September 23, 1915.

Description.—Grazed to shore line on east side; submerged vegetation very scarce and in poor condition. Water very alkaline; average greatest depth, 5 feet; hard sand bottom. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

1. Saltgrass (*Distichlis spicata*).* Abundant.
2. Cord-grass (*Spartina gracilis*).* Mature fruit; common.
3. Wild rye (*Elymus canadensis*).* Mature fruit; common.
4. Barbed witchgrass (*Panicum barbipulvinatum*).* Immature fruit; scarce.
5. Switchgrass (*Panicum virgatum*).* Mature fruit; common.
6. Slender wheat-grass (*Agropyron tenerum*).* Mature fruit; common.
7. Three-square (*Scirpus americanus*).* Abundant.
8. Spike rush (*Eleocharis palustris*).* Common.
9. Sedge (*Carex diandra*).* Mature fruit; common.
10. Rush (*Juncus balticus*).* Common.
11. Prairie gentian (*Eustoma russellianum*).* Mature fruit; scarce.
12. Purple foxglove (*Gerardia besseyana*).* Mature fruit; sparse.
13. Ragweed (*Ambrosia elatior*).* Flowers; common.
14. Sunflower (*Helianthus annuus*).* Flowers; sparse.
15. White wreath-aster (*Aster multiflorus*).* Flowers; sparse.

SEMISUBMERGED PLANTS.

Dominant:

16. Three-square (*Scirpus americanus*).

Secondary species:

17. Cord-grass (*Spartina gracilis*).
18. Tule (*Scirpus validus*). Rare.
19. Rush (*Juncus balticus*).

SUBMERGED PLANTS.

Dominant:

20. Sago pondweed (*Potamogeton pectinatus*). The only submerged plant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 18 and 20; those of less importance are: Nos. 1, 2 (17), 4, 5, 7 (16), 8, and 9; the remainder are of no known value.

GIMLET LAKE, GARDEN COUNTY.

September 24, 1915.

Description.—Lake well filled with vegetation. Small amount of open water: average greatest depth 3½ feet; bottom mostly mucky. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

1. Arrow-grass (*Triglochin maritima*).* Mature fruit; common.
2. Switchgrass (*Panicum virgatum*). Common.
3. Barbed witchgrass (*Panicum barbipulvinatum*). Sparse.
4. Wild rye (*Elymus canadensis*). Common.
5. Cord-grass (*Spartina gracilis*). Common.
6. Saltgrass (*Distichlis spicata*). Sparse.
7. Bog reedgrass (*Calamagrostis inexpansa*). Abundant.
8. Satin grass (*Muhlenbergia foliosa*). Common.
9. Sedge (*Cyperus speciosus*). Abundant.
10. Sedge (*Carex diandra teretiuscula*). Common.
11. Sedge (*Carex haydeni*).*[1] Common.
12. Sedge (*Carex vulpinoidea*).* Flowers; sparse.
13. Rush (*Juncus balticus*). Abundant.
14. Rush (*Juncus torreyi*).* Abundant.
15. Rush (*Juncus dudleyi*).* Common.
16. Water smartweed (*Polygonum amphibium*).* Common.
17. Ragweed (*Ambrosia elatior*). Common.
18. Bur marigold (*Bidens laevis*). Common.
19. Sunflower (*Helianthus annuus*). Sparse.
20. White wreath-aster (*Aster multiflorus*). Sparse.

SEMISUBMERGED PLANTS.

Dominant:

21. Tule (*Scirpus validus*).* Mature fruit.

Secondary species:

A number of plants listed under shore vegetation grow in shallow water in addition to the following:

22. Cat-tail (*Typha latifolia*). Common.
23. Bur reed (*Sparganium eurycarpum*).
24. Water plantain (*Alisma subcordatum*). Common.
25. Wapato (*Sagittaria latifolia*). Common.
26. Cord-grass (*Spartina gracilis*).
27. Reed (*Phragmites communis*).*
28. Big bulrush (*Scirpus occidentalis*).* Scarce.
29. Water pepper (*Polygonum punctatum*). Common.
30. Water smartweed (*Polygonum amphibium*).* Flowers to mature fruit; common.
31. Curly dock (*Rumex crispus*). Sparse.
32. Water hemlock (*Cicuta maculata*).
33. Willow aster (*Aster salicifolius*). Common.

SUBMERGED PLANTS.

Dominants:

34. Sago pondweed (*Potamogeton pectinatus*).* Mature fruit.
35. Coontail (*Ceratophyllum demersum*).*

Secondary species:

36. Water moss (*Drepanocladus* sp.). Common.
37. Bushy pondweed (*Najas flexilis*). Sparse.
38. Water smartweed (*Polygonum amphibium*). Common.
39. Bladderwort (*Utricularia vulgaris*). Sparse.

FLOATING PLANTS.

40. Small duckweed (*Lemna minor*).*
41. Star duckweed (*Lemna trisulca*).* Abundant.
42. Water-meal (*Wolffia punctata*).* Abundant.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 21, 28, 34, 35, 37, 40, 41, and 42; those of less importance are: Nos. 1, 2, 3, 5 (26), 6, 9. 10, 11, 12, 16 (30, 38), 18, 23, 24, 25, and 29; the remainder are of no known value.

[1] Mr. G. P. Van Eseltine, who identified this specimen, notes that it represents an apparently undescribed form, of which he has seen specimens elsewhere, but which until named may be conveniently classed with its nearest relative, *haydeni*.

CRESCENT LAKE, GARDEN COUNTY.

September 26, 1915.

Description.—Grazed to shore line on east and south sides. Mostly open water, probably somewhat alkaline; average greatest depth 10 to 11 feet; bottom sandy. No current except that caused by wind. Inlet from lake at southwest end.

Distribution of Vegetation.

SHORE PLANTS.

About as for Gimlet Lake; in addition, the following:

1. Redtop (*Agrostis alba*).*
2. Straw sedge (*Cyperus strigosus*).* Mature fruit; common.
3. Sedge (*Cyperus schweinitzii*).* Mature fruit.
4. Water hoarhound (*Lycopus americanus*).* Mature fruit; common.
5. Blue verbena (*Verbena hastata*).* Mature fruit.
6. Willow aster (*Aster salicifolius*).* Flowers.

SEMISUBMERGED PLANTS.

Dominant:

7. Tule (*Scirpus validus*).

Secondary species:

8. Cat-tail (*Typha latifolia*).
9. Bur reed (*Sparganium eurycarpum*). Common.
10. Water plantain (*Alisma subcordatum*). Common.
11. Wapato (*Sagittaria latifolia*). Common.

Also, some of the shore plants growing in shallow water, as:

12. Arrow-grass (*Triglochin maritima*).
13. Wild millet (*Echinochloa crus-galli*). Common.
14. Reed (*Phragmites communis*). Common.
15. Cordgrass (*Spartina gracilis*). Common.
16. Bog reedgrass (*Calamagrostis inexpansa*).
17. Rush (*Juncus balticus*).
18. Rush (*Juncus dudleyi*).
19. Rush (*Juncus torreyi*).
20. Water smartweed (*Polygonum amphibium*).
21. Water hemlock (*Cicuta maculata*). Sparse.

SUBMERGED PLANTS.

Dominant:

22. Sago pondweed (*Potamogeton pectinatus*).

Secondary species:

23. Curly pondweed (*Potamogeton perfoliatus richardsonii*).* Immature fruit; rare.
24. Water smartweed (*Polygonum amphibium*).

FLOATING PLANTS.

25. Butterflywort (*Riccia natans*).*
26. Small duckweed (*Lemna minor*).
27. Star duckweed (*Lemna trisulca*).
28. Water-meal (*Wolffia punctata*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 7, 11, 22, 26, and 27; those of less importance are: Nos. 2, 3, 9, 10, 12, 13, 15, 20 (24), 23, and 28; the remainder are of no known value.

BEAVER (OR BLUE) LAKE, GARDEN COUNTY.

September 27–28, 1915.

Description.—Practically all open water; probably somewhat alkaline; average greatest depth 15 to 16 feet; bottom sandy. Inlet from Jones Lake; outlet into Crescent Lake; probably some current flowing east.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

About as for Crescent Lake, in addition the following:

1. Wild millet (*Echinochloa crus-galli*).* Mature fruit; common.
2. Rice cut-grass (*Homalocenchrus oryzoides*).* Immature fruit; sparse.
3. Spike rush (*Eleocharis,* probably *glaucescens*).* Abundant.
4. Heart's-ease (*Polygonum pennsylvanicum*).* Mature fruit.
5. Bushy knotweed (*Polygonum ramosissimum*).* Mature fruit; sparse.
6. Western chokecherry (*Padus melanocarpa*).* Rare.
7. Touch-me-not (*Impatiens biflora*).* Mature fruit; sparse.
8. Willow herb (*Epilobium lineare*).* Mature fruit; common.
9. Water hoarhound (*Lycopus asper*).* Mature fruit; common.
10. Black nightshade (*Solanum nigrum*).* Mature fruit; rare.
11. Bushy goldenrod (*Euthamia graminifolia*).* Flowers; common.
12. Sunflower (*Helianthus annuus*).* Flowers.
13. Bur marigold (*Bidens laevis*).* Flowers.

SEMISUBMERGED PLANTS.

Dominant:

14. Tule (*Scirpus validus*).

Secondary species:

15. Cat-tail (*Typha latifolia*). Sparse.
16. Water plantain (*Alisma subcordatum*). Common.
17. Reed (*Phragmites communis*).
18. Cord-grass (*Spartina gracilis*).
19. Three-square (*Scirpus americanus*).
20. Spike rush (*Eleocharis,* probably *glaucescens*). Common.
21. Water hemlock (*Cicuta maculata*). Sparse.

SUBMERGED PLANTS.

Dominant:

22. Sago pondweed (*Potamogeton pectinatus*).

Secondary species:

23. Spike rush (*Eleocharis,* probably *glaucescens*).

FLOATING PLANTS.

24. Star duckweed (*Lemna trisulca*). Not common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 14, 22, and 24; those of less importance are: Nos. 1, 2, 3, 4, 13, 16, 18, 19, and 20 (23); the remainder are of no known value.

JONES LAKE, GARDEN COUNTY.

September 27–28, 1915.

Description.—Bottom sandy; depth, 6 to 8 feet. Inlet from Swan Lake; outlet into Blue Lake.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

About as for Crescent Lake; in addition the following:

1. Wild millet (*Echinochloa crus-galli*). Common.
2. Rice cut-grass (*Homalocenchrus oryzoides*). Sparse.
3. Redtop (*Agrostis alba*).
4. Straw sedge (*Cyperus strigosus*). Common.
5. Sedge (*Cyperus schweinitzii*).
6. Spike rush (*Eleocharis,* probably *glaucescens*). Abundant.
7. Bushy knotweed (*Polygonum ramosissimum*). Sparse.
8. Heart's-ease (*Polygonum pennsylvanicum*). Common.
9. Western chokecherry (*Padus melanocarpa*). Rare.
10. Touch-me-not (*Impatiens biflora*). Sparse.
11. Willow herb (*Epilobium lineare*). Common.
12. Blue verbena (*Verbena hastata*).
13. Water hoarhound (*Lycopus americanus*). Common.
14. Water hoarhound (*Lycopus asper*). Common.
15. Black nightshade (*Solanum nigrum*). Rare.
16. Bushy goldenrod (*Euthamia graminifolia*). Common.
17. Sunflower (*Helianthus annuus*).
18. Bur marigold (*Bidens laevis*).
19. Willow aster (*Aster salicifolius*).

SEMISUBMERGED PLANTS.

Dominant:
20. Tule (*Scirpus validus*).

Secondary species:
21. Cat-tail (*Typha latifolia*).
22. Bur reed (*Sparganium eurycarpum*).
23. Wapato (*Sagittaria latifolia*).
24. Reed (*Phragmites communis*).
25. Cord-grass (*Spartina gracilis*).
26. Three-square (*Scirpus americanus*).
27. Spike rush (*Eleocharis,* probably *glaucescens*).
28. Water smartweed (*Polygonum amphibium*).
29. Water hemlock (*Cicuta maculata*).

SUBMERGED PLANTS.

Dominant:
30. Sago pondweed (*Potamogeton pectinatus*).

Secondary species:
31. Spike rush (*Eleocharis,* probably *glaucescens*).
32. Water smartweed (*Polygonum amphibium*).
33. Bladderwort (*Utricularia vulgaris*).

FLOATING PLANTS.

34. Small duckweed (*Lemna minor*).
35. Star duckweed (*Lemna trisulca*). Abundant.
36. Water-meal (*Wolffia punctata*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are Nos. 20, 23, 30, 34, and 35; those of less importance are Nos. 1, 2, 4, 5, 6 (27, 31), 8, 18, 22, 25, 26, 28 (32), and 36; the remainder are of no known value.

SWAN LAKE, GARDEN COUNTY.

September 27–28, 1915.

Description.—Grazed to water's edge. Water probably alkaline; depth, 8 to 10 feet; bottom sandy. No inlet; outlet into Jones Lake.

DESCRIPTION OF VEGETATION.

SHORE PLANTS.

About as for Crescent Lake; in addition the following:

1. Wild millet (*Echinochloa crus-galli*). Common.
2. Rice cut-grass (*Homalocenchrus oryzoides*). Sparse.
3. Spike rush (*Eleocharis,* probably *glaucescens*). Abundant.
4. Bushy knotweed (*Polygonum ramosissimum*). Sparse.
5. Heart's-ease (*Polygonum pennsylvanicum*). Common.
6. Western chokecherry (*Padus melanocarpa*). Rare.
7. Wild bean (*Strophostyles pauciflora*).* Mature fruit.
8. Touch-me-not (*Impatiens biflora*). Sparse.
9. Willow herb (*Epilobium lineare*). Common.
10. Water hoarhound (*Lycopus asper*). Common.
11. Black nightshade (*Solanum nigrum*). Rare.
12. Bushy goldenrod (*Euthamia graminifolia*). Common.
13. Sunflower (*Helianthus annuus*).
14. Bur marigold (*Bidens laevis*).

SEMISUBMERGED PLANTS.

Dominant:
15. Tule (*Scirpus validus*).

Secondary species:
16. Cat-tail (*Typha latifolia*).
17. Bur reed (*Sparganium eurycarpum*).
18. Cord-grass (*Spartina gracilis*).
19. Spike rush (*Eleocharis,* probably *glaucescens*).
20. Water smartweed (*Polygonum amphibium*).

SUBMERGED PLANTS.

Dominant:
21. Sago pondweed (*Potamogeton pectinatus*).

Secondary species:
22. Curly pondweed (*Potamogeton perfoliatus richardsonii*). Sparse.
23. Spike rush (*Eleocharis*, probably *glaucescens*).

FLOATING PLANTS.

24. Small pondweed (*Lemna minor*).
25. Star duckweed (*Lemna trisulca*).
26. Water-meal (*Wolffia punctata*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 15, 21, 24, and 25; those of less importance are: Nos. 1, 2, 3 (19, 23), 5, 17, 18, 20, 22, and 26; the remainder are of no known value.

RENO LAKE, GARDEN COUNTY.

September 29, 1915.

Description.—Marsh on north side. Water 4 to 5 feet deep; bottom mostly sandy; muck bottom in marsh. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Grasses, sedges, etc., as listed for neighboring lakes; grazed to shore line on south side.

SEMISUBMERGED PLANTS.

Dominant:
1. Tule (*Scirpus validus*).

Secondary species:
2. Cat-tail (*Typha latifolia*). Common.
3. Bur reed (*Sparganium eurycarpum*).
4. Wapato (*Sagittaria latifolia*). Common.
5. Cord-grass (*Spartina gracilis*). Common.
6. Reed (*Phragmites communis*). Common.
7. Three-square (*Scirpus americanus*). Common.
8. Big bulrush (*Scirpus occidentalis*). Rare.
9. Spike rush (*Eleocharis*, probably *glaucescens*). Abundant.
10. Water smartweed (*Polygonum amphibium*).
11. Water hemlock (*Cicuta maculata*).

SUBMERGED PLANTS.

Dominant:
12. Sago pondweed (*Potamogeton pectinatus*).* Mature fruit.

Secondary species:
13. Small pondweed (*Potamogeton pusillus*). Common.
14. Widgeon grass (*Ruppia occidentalis*).*
15. Spike rush (*Eleocharis acicularis*).
16. Spike rush (*Eleocharis*, probably *glaucescens*).
17. Water smartweed (*Polygonum amphibium*). Common.
18. Bladderwort (*Utricularia vulgaris*). Common.

FLOATING PLANT.

19. Star duckweed (*Lemna trisulca*).*

Wild-duck foods.—Plants in the above list which have considerable value as food for wild-ducks are: Nos. 1, 4, 8, 12, 13, 14, and 19; those of less importance are: Nos. 3, 5, 7, 9 (16), 10 (17), and 15; the remainder are of no known value.

TRAINOR LAKES, GARDEN COUNTY.

September 30, 1915.

Description.—North Trainor Lake, small; South Trainor Lake, about half open water; the two connect by a small stream. Fresh water; bottom mostly sandy; mucky in part of marsh area; average greatest depth, 3 to 4 feet.

Distribution of Vegetation.

SHORE PLANTS.

Typical meadow of grasses, sedges, rushes, mints, etc., as listed for neighboring lakes.

SEMISUBMERGED PLANTS.

Dominant:

1. Tule (*Scirpus validus*).

Secondary species:

2. Horsetail (*Equisetum* sp.)
3. Cat-tail (*Typha latifolia*). Common.
4. Bur reed (*Sparganium eurycarpum*). Sparse.
5. Water plantain (*Alisma subcordatum*). Common.
6. Wapato (*Sagittaria latifolia*). Common.
7. Cord-grass (*Spartina gracilis*). Common.
8. Reed (*Phragmites communis*). Common.
9. Three-square (*Scirpus americanus*). Common.
10. Spike rush (*Eleocharis acicularis*).
11. Spike rush (*Eleocharis*, probably *glaucescens*).
12. Sedge (*Carex utriculata*).*
13. Water smartweed (*Polygonum amphibium*).
14. Water hemlock (*Cicuta maculata*). Rare.

—. Other grasses, etc., of shore, growing in shallow water.

SUBMERGED PLANTS.

Dominants:

15. Sago pondweed (*Potamogeton pectinatus*).
16. Bladderwort (*Utricularia vulgaris*).* With winter buds.

Secondary species:

17. Musk grass (*Chara* sp.).* Common.
18. Small pondweed (*Potamogeton pusillus*).* Winter buds; common.
19. Widgeon grass (*Ruppia occidentalis*).* Common.
20. Spike rush (*Eleocharis acicularis*).* Common.
21. Spike rush (*Eleocharis*, probably *glaucescens*).
22. Water smartweed (*Polygonum amphibium*). Common.

FLOATING PLANTS.

23. Small duckweed (*Lemna minor*). Common.
24. Star duckweed (*Lemna trisulca*). Common.
25. Water-meal (*Wolffia punctata*). Common.

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 1, 6, 15, 17, 18, 19, 23, and 24; those of less importance are: Nos. 4, 5, 7, 9, 10 (20), 11 (21), 12, 13 (22), and 25; the remainder are of no known value.

PETERSON LAKE NO. 1, GARDEN COUNTY.

October 2, 1915.

Description.—Bottom mucky; average greatest depth, 2 feet. No inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

Grasses, etc., as listed for neighboring lakes.

SEMISUBMERGED PLANTS.

Dominant:
1. Tule (*Scirpus validus*).

Secondary species:
2. Cat-tail (*Typha latifolia*).
3. Bur reed (*Sparganium eurycarpum*).
4. Water plantain (*Alisma subcordatum*).
5. Wapato (*Sagittaria latifolia*).
6. Cord-grass (*Spartina gracilis*).
7. Reed (*Phragmites communis*). Common.
8. Three-square (*Scirpus americanus*).
9. Water smartweed (*Polygonum amphibium*). Common.
10. Water hemlock (*Cicuta maculata*).

SUBMERGED PLANTS.

11. Musk grass (*Chara* sp.).
12. Sago pondweed (*Potamogeton pectinatus*).
13. Small pondweed (*Potamogeton pusillus*).
14. Spike rush (*Eleocharis acicularis*).
15. Spike rush (*Eleocharis*, probably *glaucescens*).
16. Water smartweed (*Polygonum amphibium*).
17. White water crowfoot (*Batrachium divaricatum*).* Common.
18. Bladderwort (*Utricularia vulgaris*).

FLOATING PLANTS.

19. Star duckweed (*Lemna trisulca*). Very abundant.
20. Small duckweed (*Lemna minor*).
21. Water-meal (*Wolffia punctata*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are Nos. 1, 5, 11, 12, 13, 19, and 20; those of less importance are: Nos. 3, 4, 6, 8, 9 (16), 14, 15, 17, and 21; the remainder are of no known value.

PETERSON LAKE NO. 2, GARDEN COUNTY.

October 2, 1915.

Description.—Bottom mucky; average depth 4 feet. No inlet or outlet.

DISTRIBUTION OF VEGETATION.

SHORE PLANTS.

Grasses, etc., as listed for neighboring lakes; in addition the following:
1. Spider flower (*Cleome serrulata*).* Mature fruit.

SEMISUBMERGED PLANTS.

Dominant:
2. Tule (*Scirpus validus*).

Secondary species:
3. Three-square (*Scirpus americanus*).

SUBMERGED PLANTS.

Dominant:
4. Widgeon grass (*Ruppia occidentalis*).* Immature fruit; practically fills lake, which was covered with ducks apparently feeding on this plant.

Secondary species:
5. Sago pondweed (*Potamogeton pectinatus*).

Wild-duck foods.—Plants in the above list which have considerable value as food for wild ducks are: Nos. 2, 4, and 5; one of less importance is 3; the remaining one is of no known value.

PHALAROPE LAKE, GARDEN COUNTY.

October 3, 1915.

Description.—Alkaline water; average greatest depth, 3 feet; bottom sandy. No inlet or outlet.

Distribution of Vegetation.

SHORE PLANTS.

About as for Moffitt Lake.

SEMISUBMERGED PLANT.

Dominant:

1. Three-square (*Scirpus americanus*). The only one.

SUBMERGDD PLANT.

2. Sago pondweed (*Potamogeton pectinatus*). The only plant growing submerged.

Wild-duck foods.—Both plants in the above list have considerable value as food for wild ducks.

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